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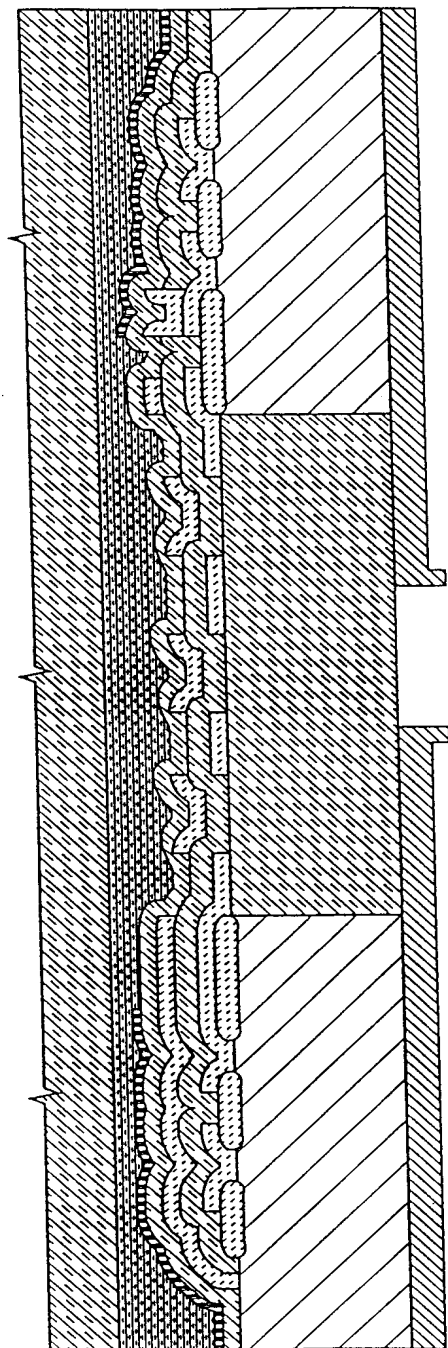


FIG. 110

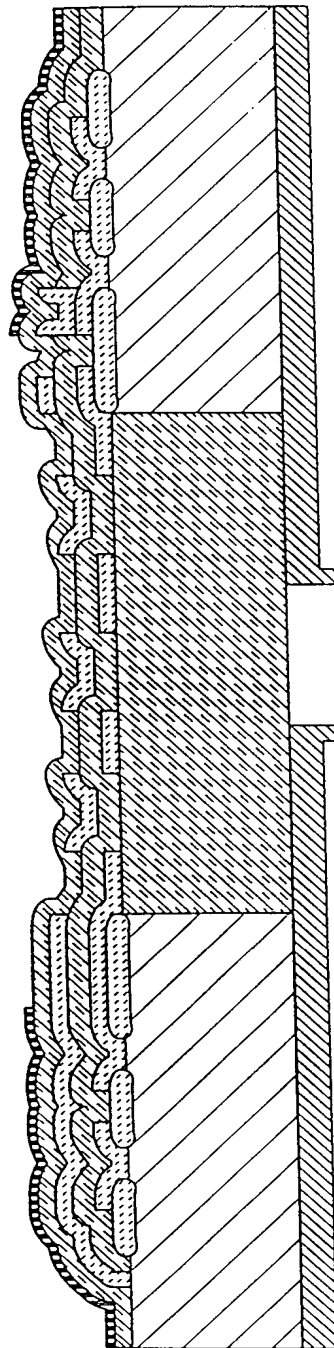


FIG. 111

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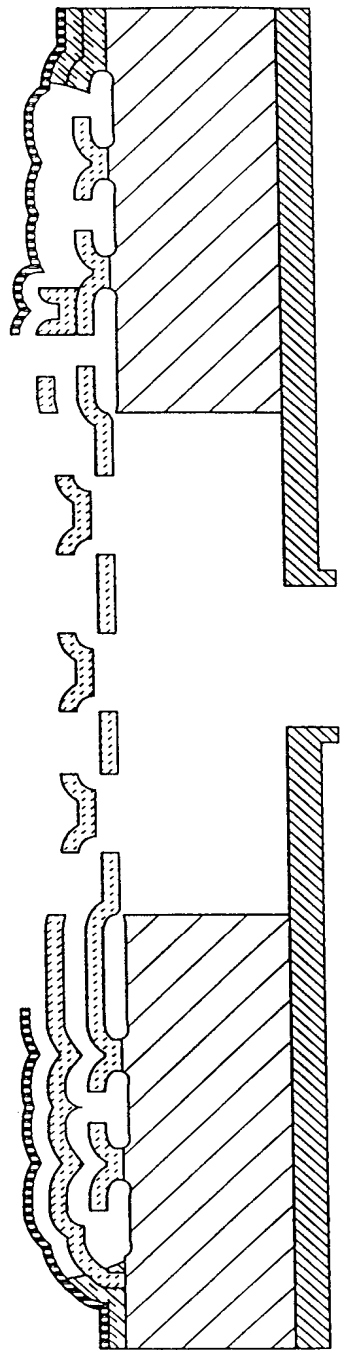


FIG. 112

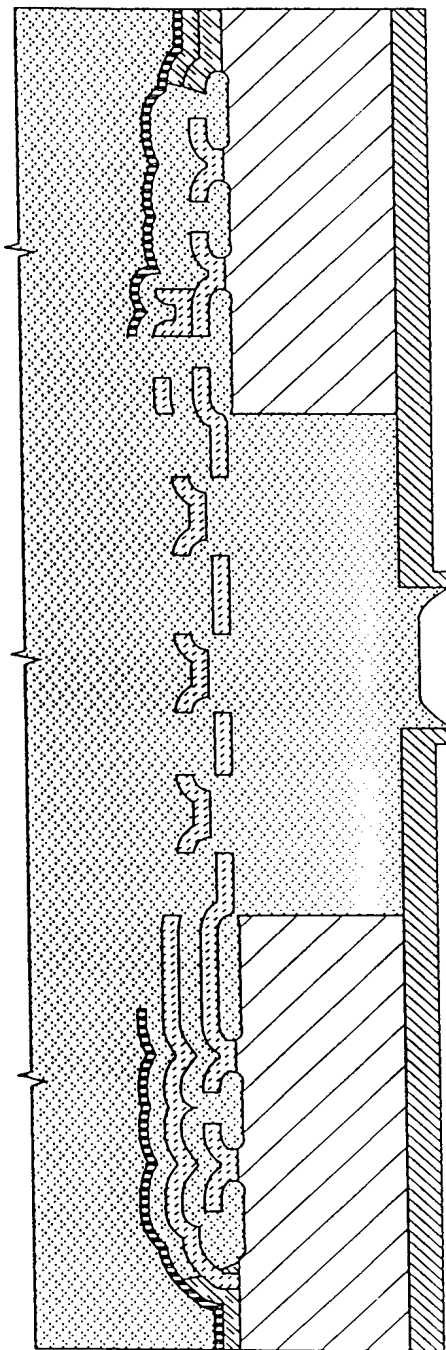


FIG. 113

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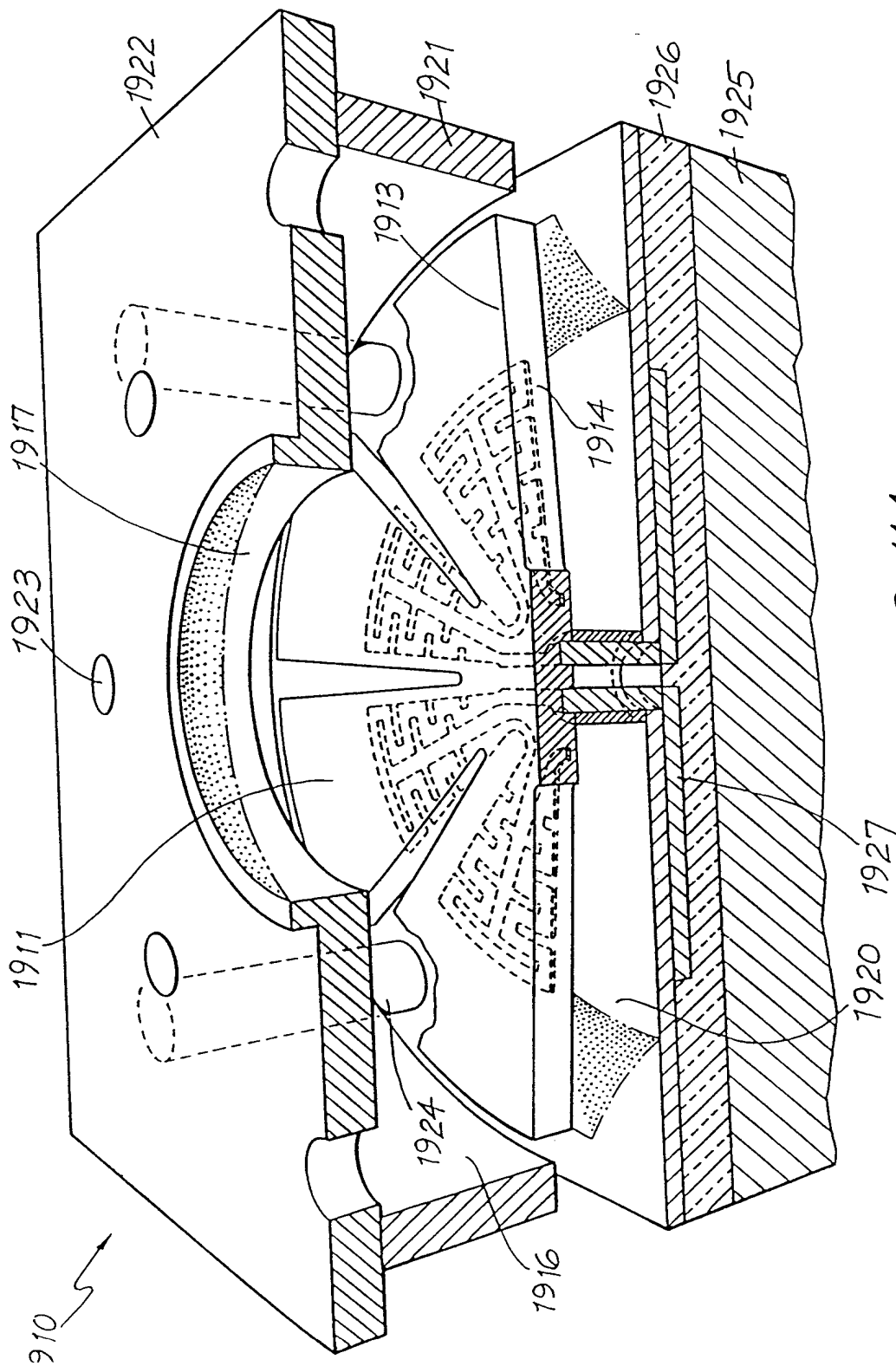
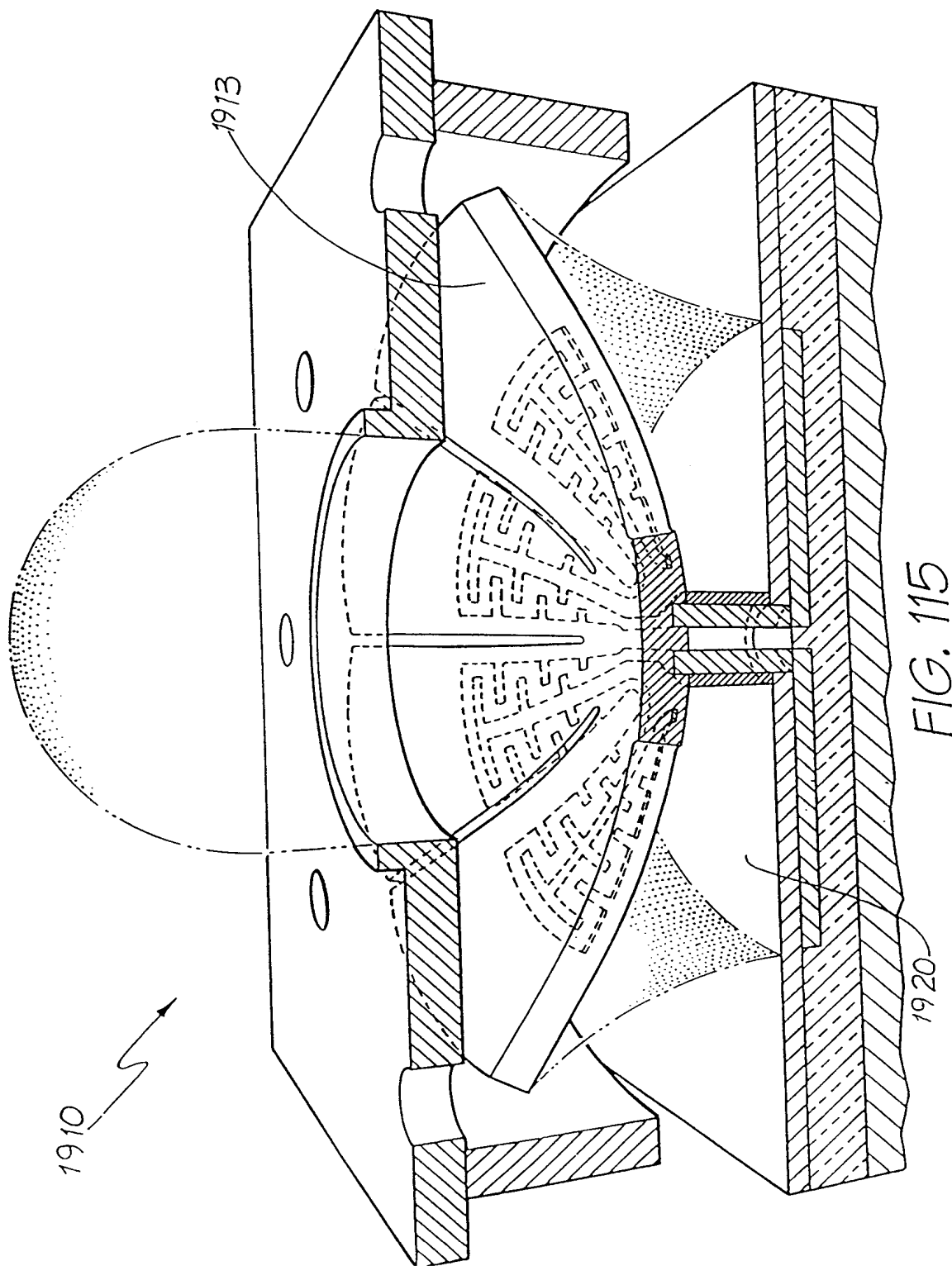
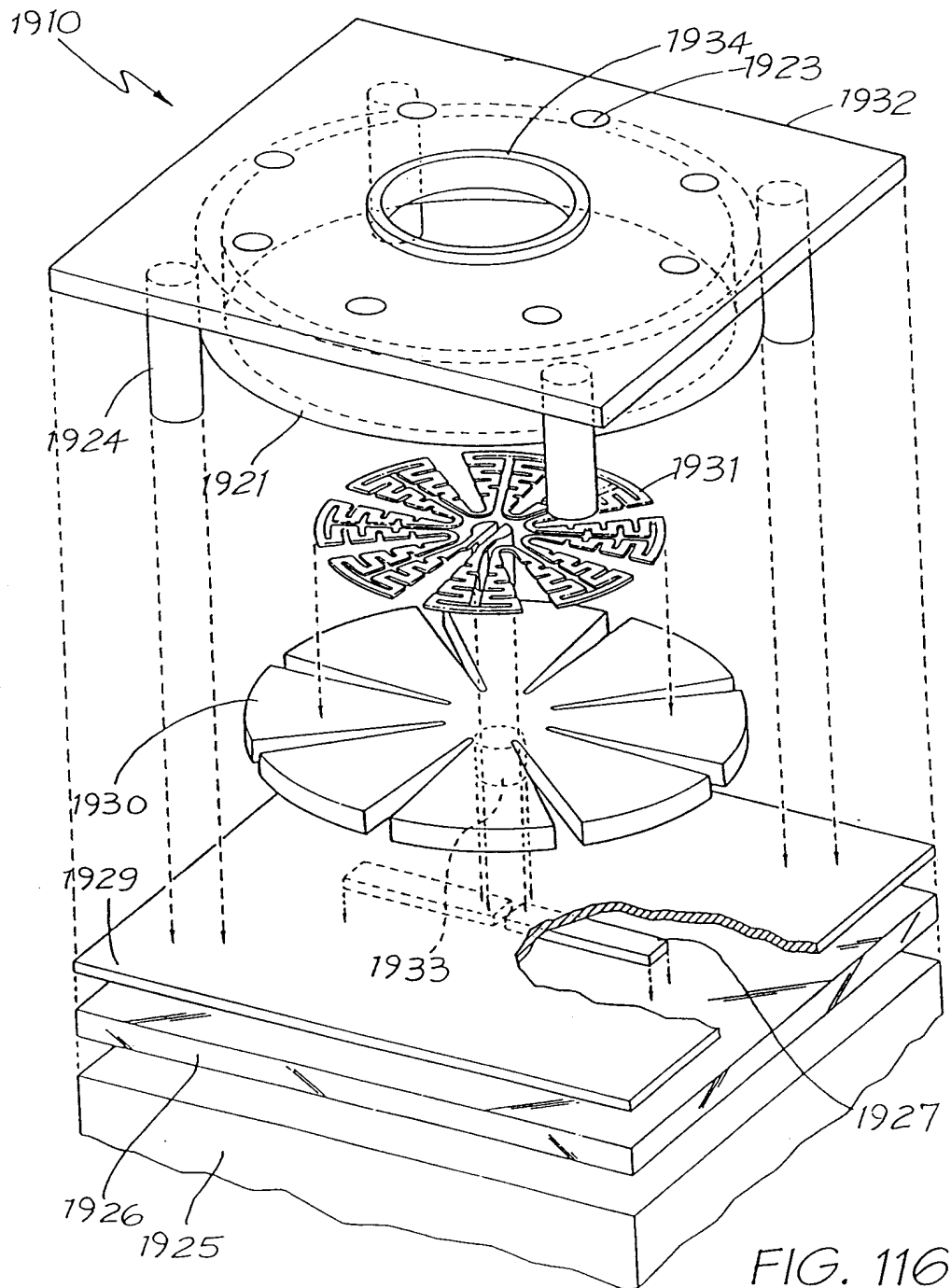


FIG. 114

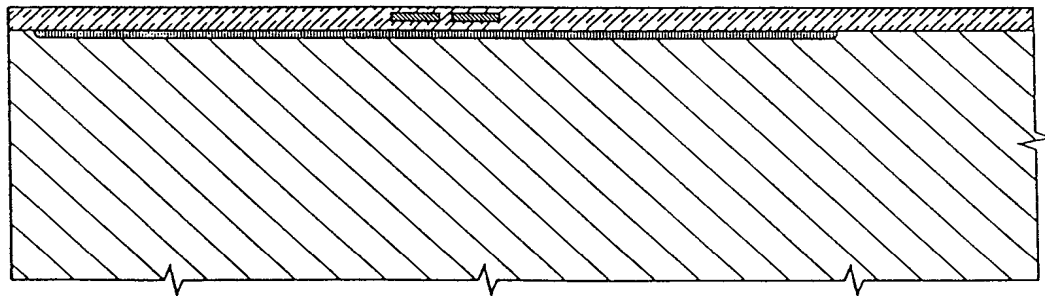
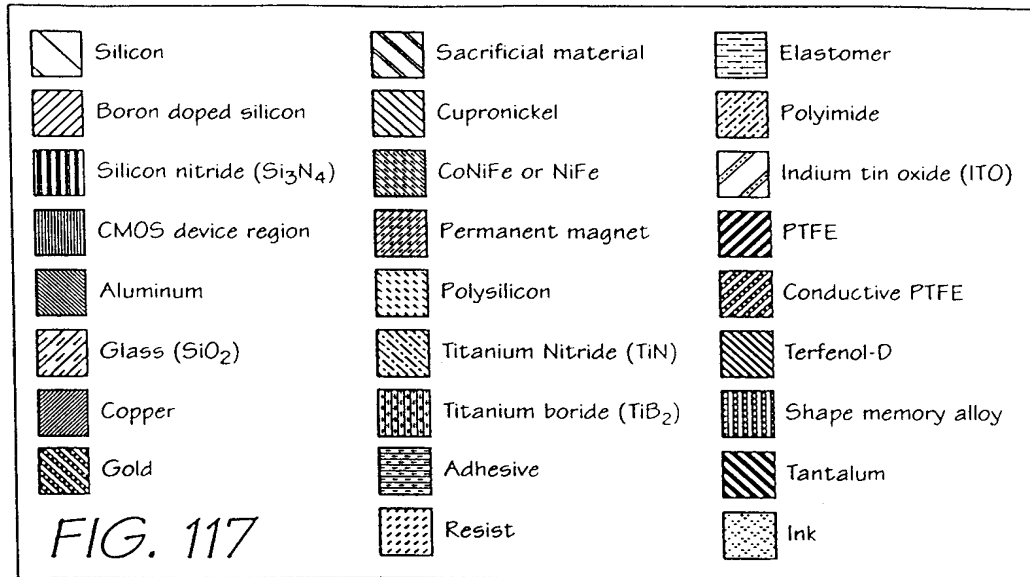
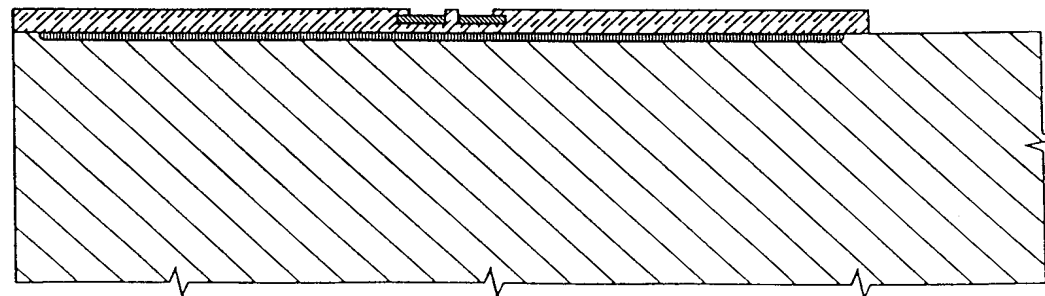
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**FIG. 118****FIG. 119**

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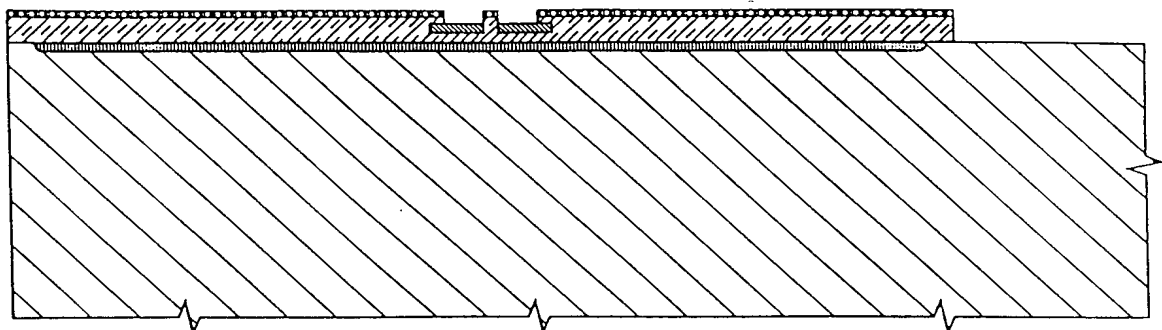


FIG. 120

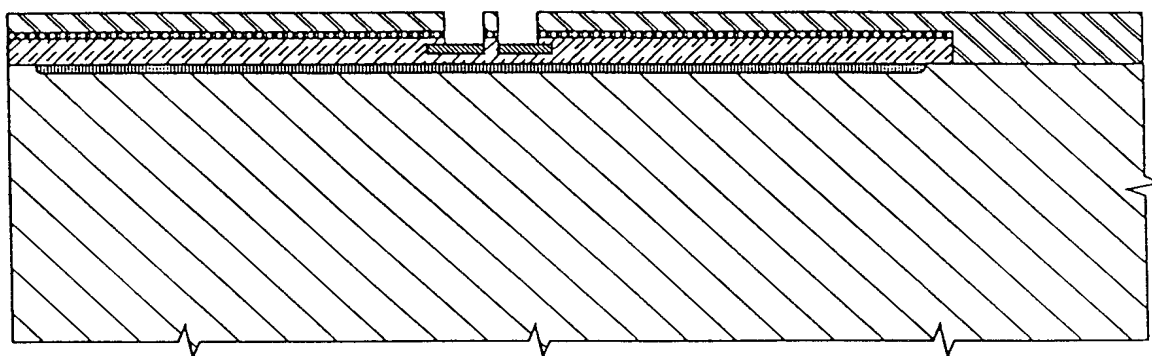


FIG. 121

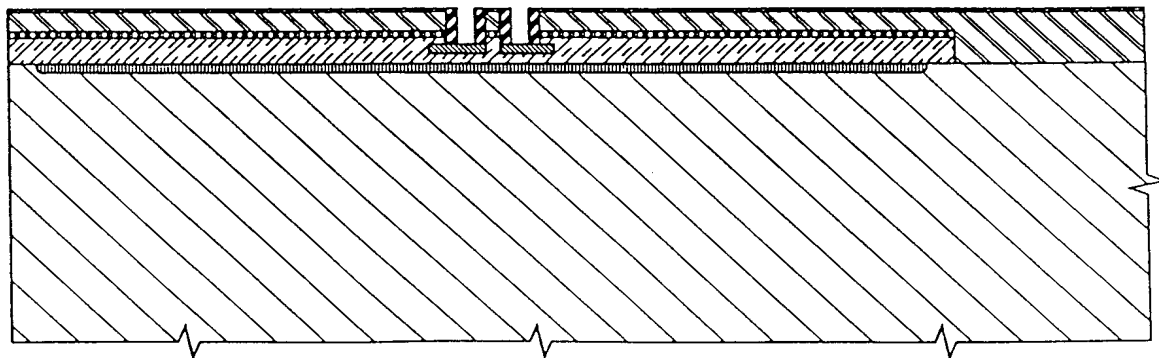


FIG. 122

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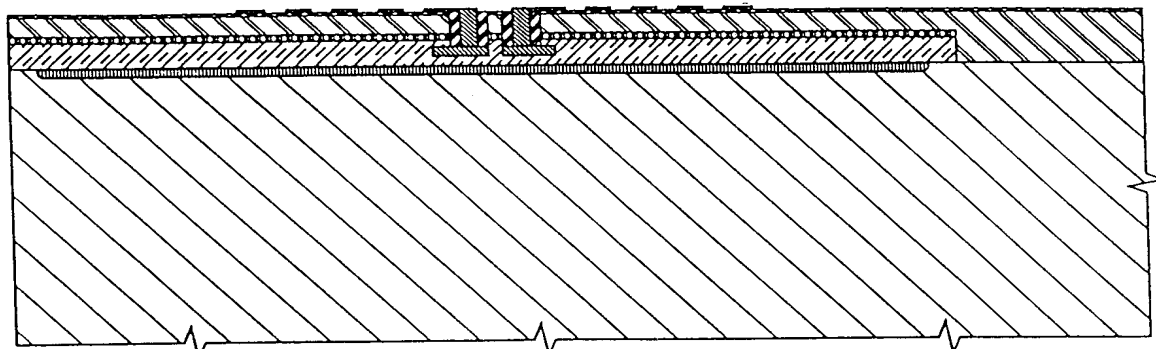


FIG. 123

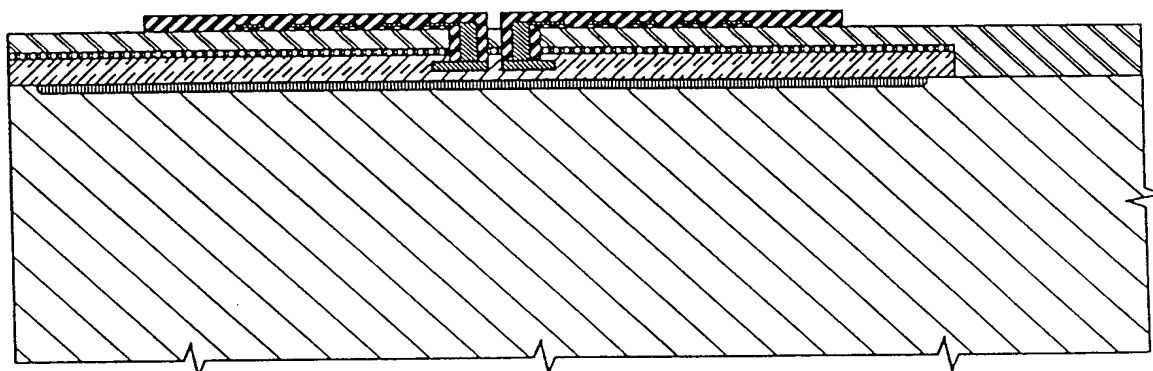


FIG. 124

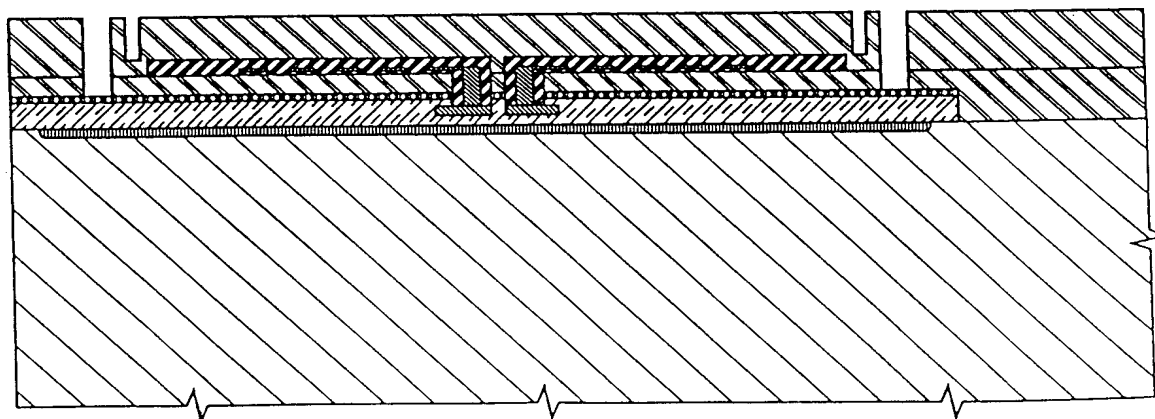


FIG. 125

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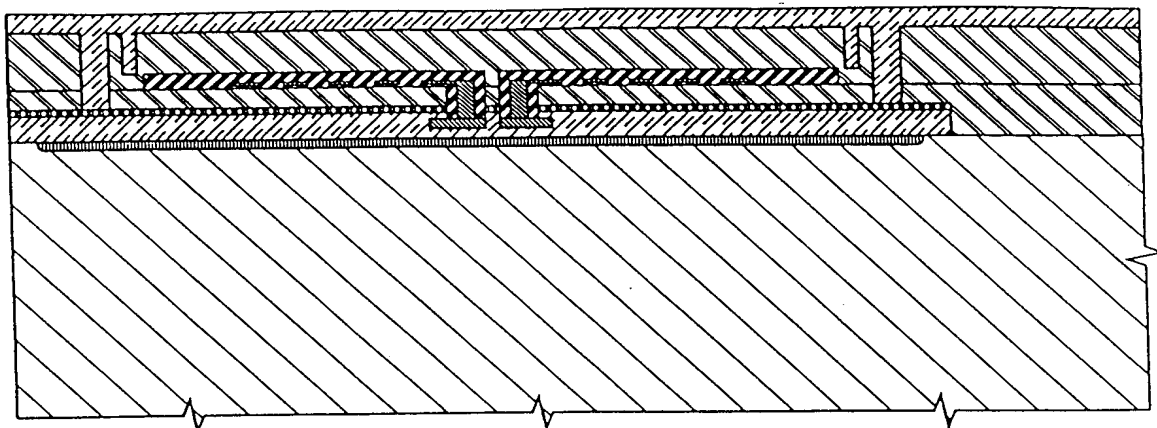


FIG. 126

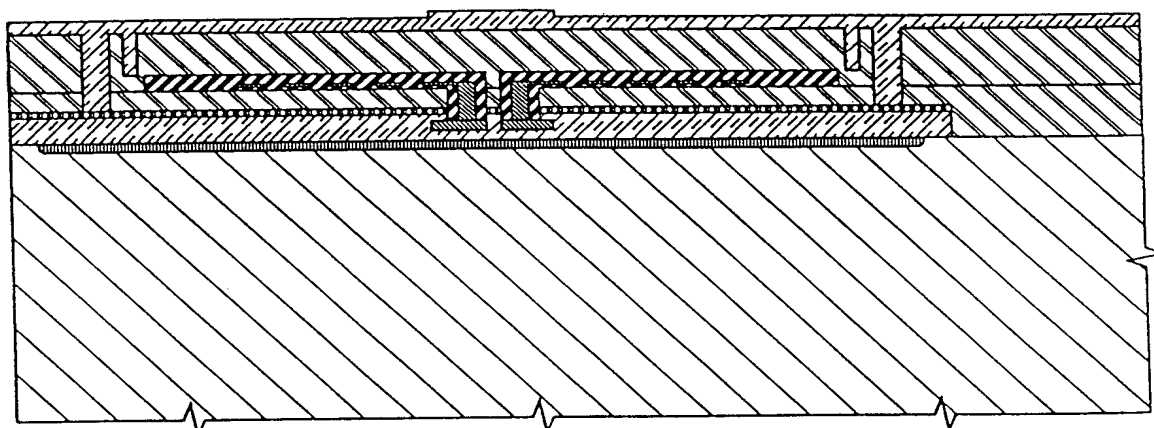


FIG. 127

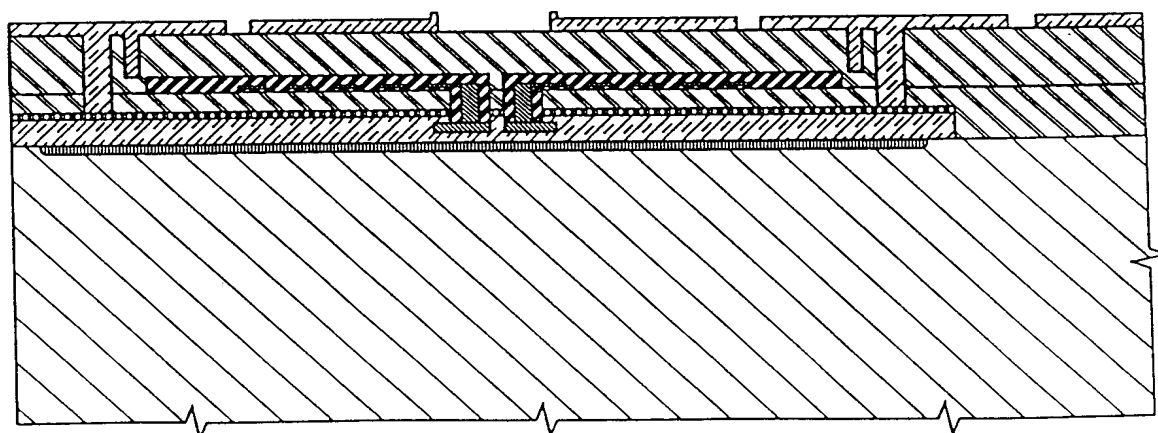


FIG. 128

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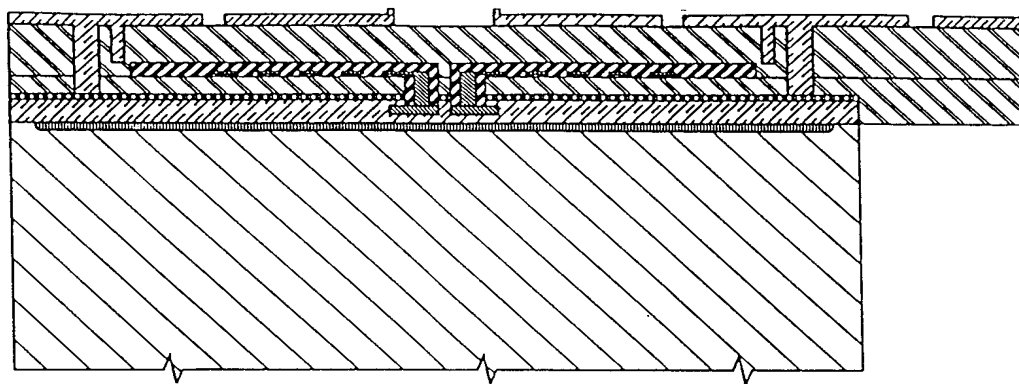


FIG. 129

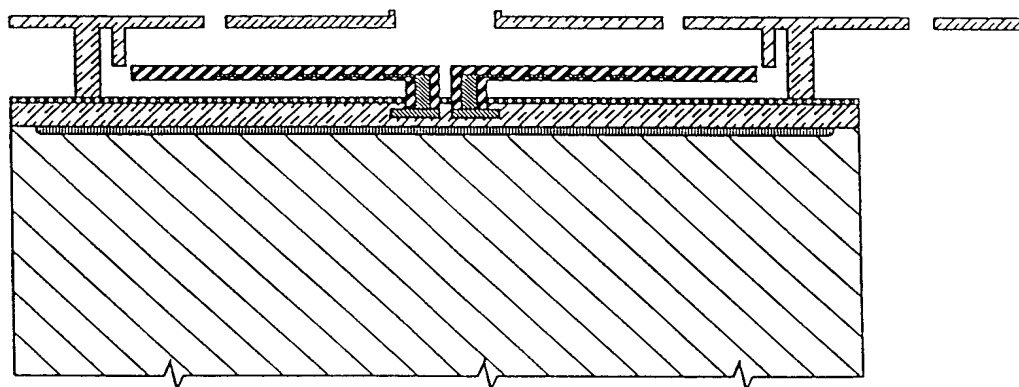


FIG. 130

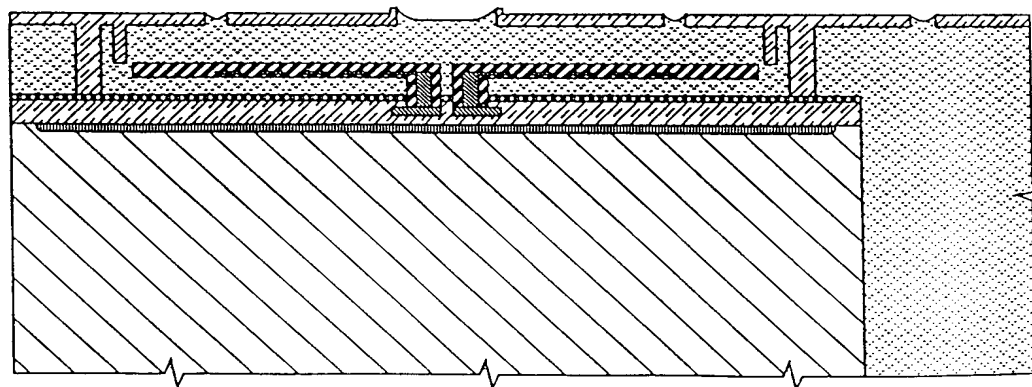


FIG. 131

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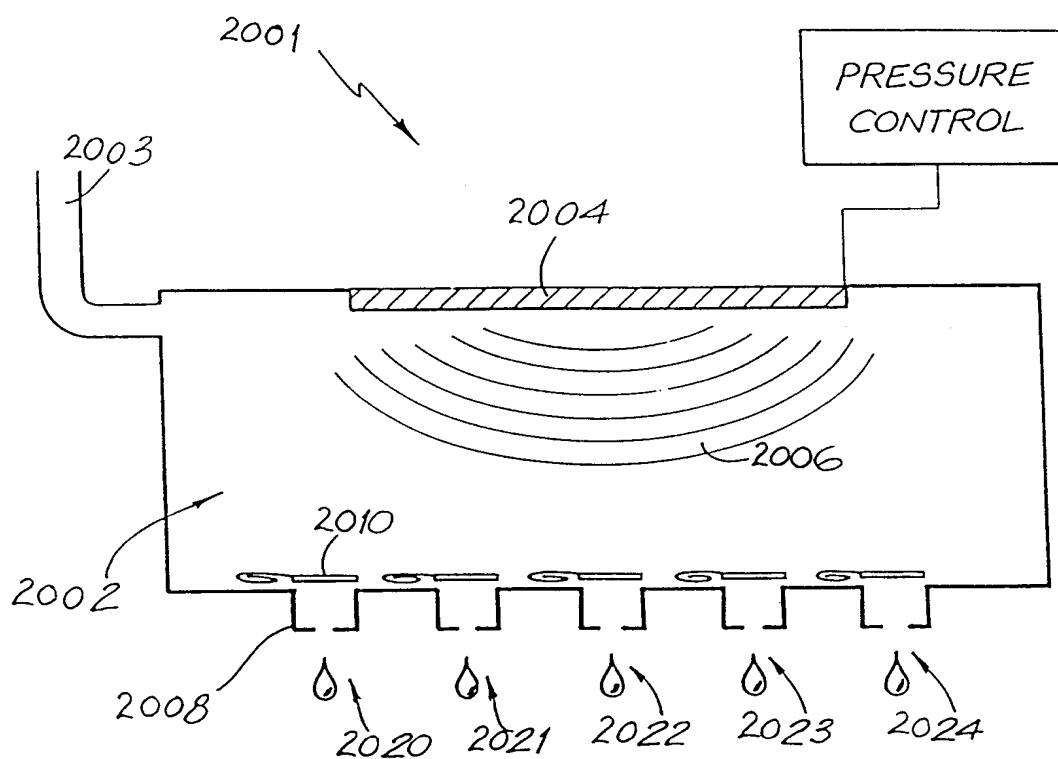


FIG. 132

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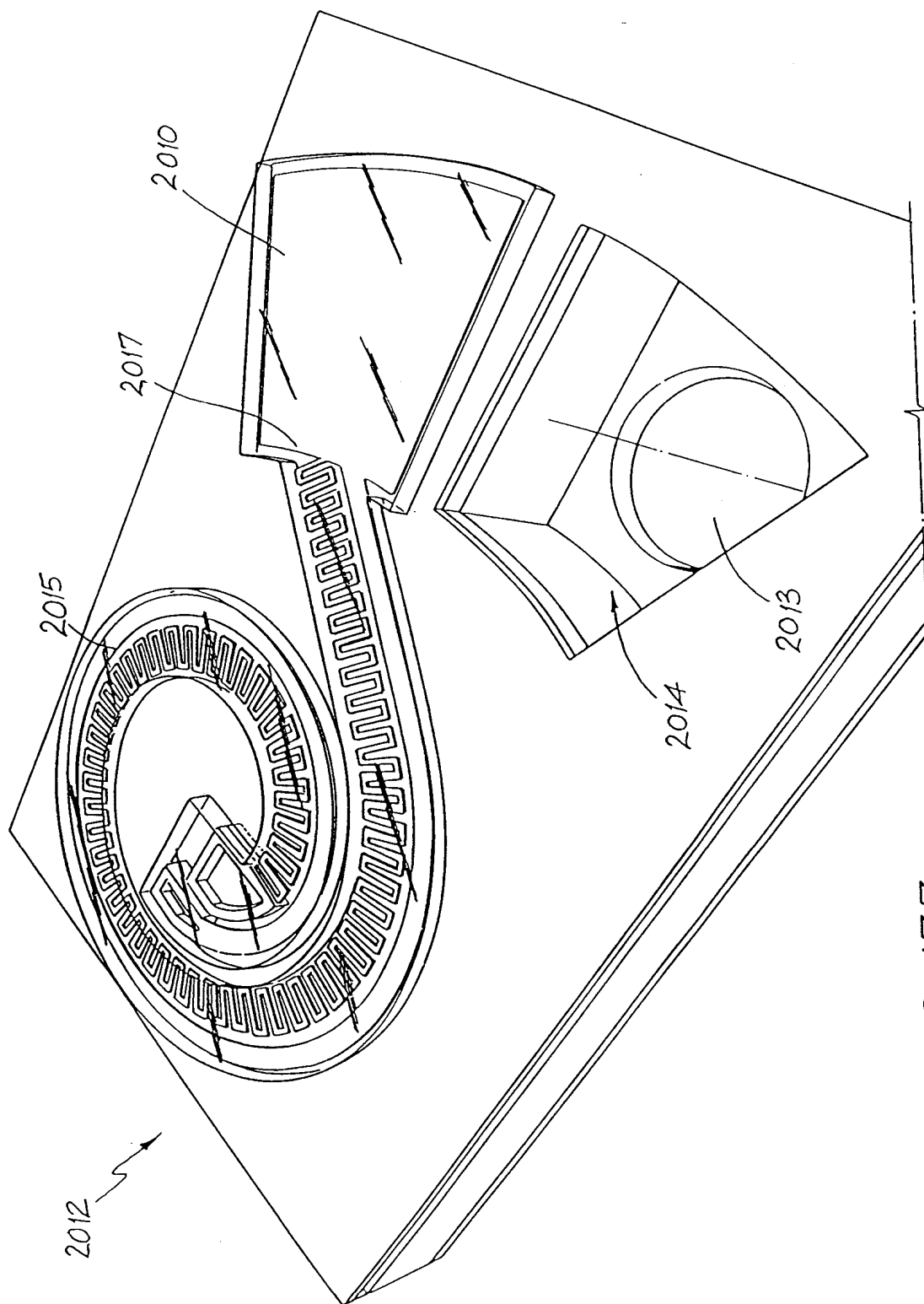


FIG. 133

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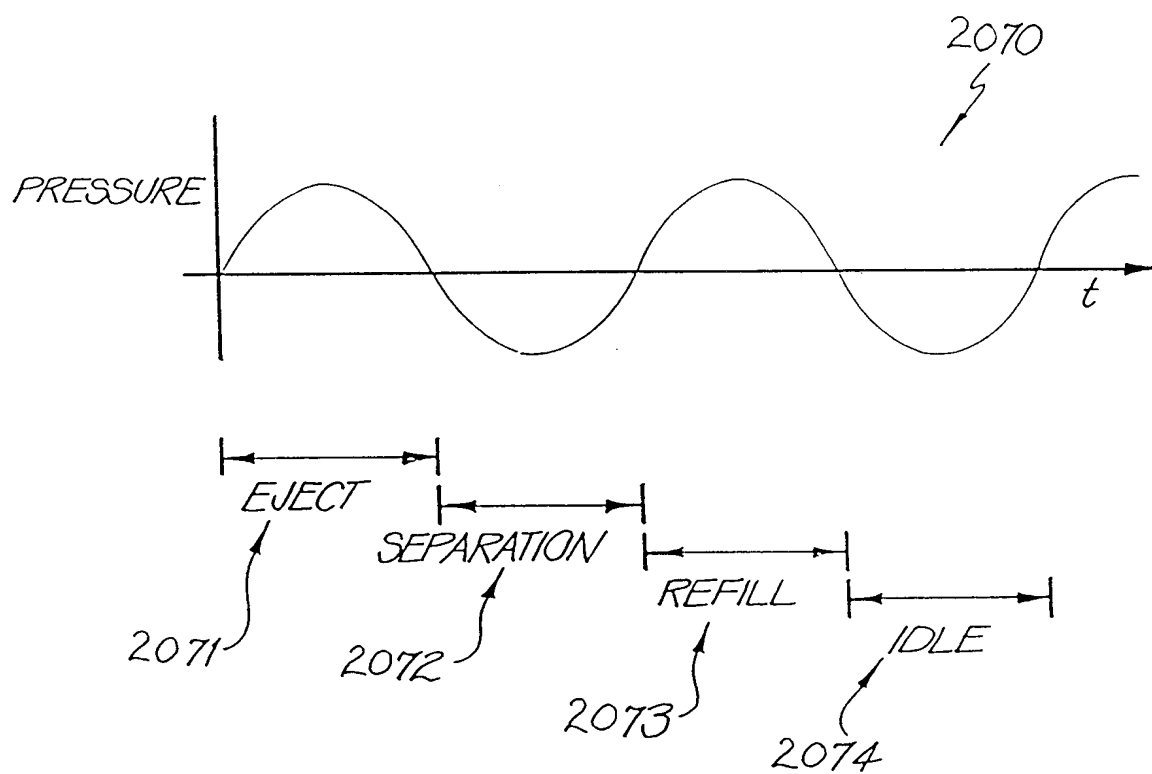


FIG. 134

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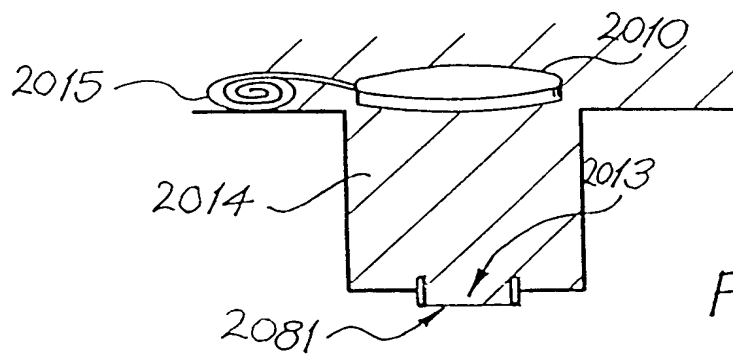


FIG. 135

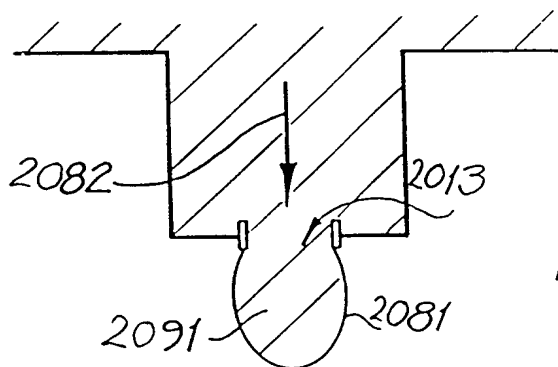


FIG. 136

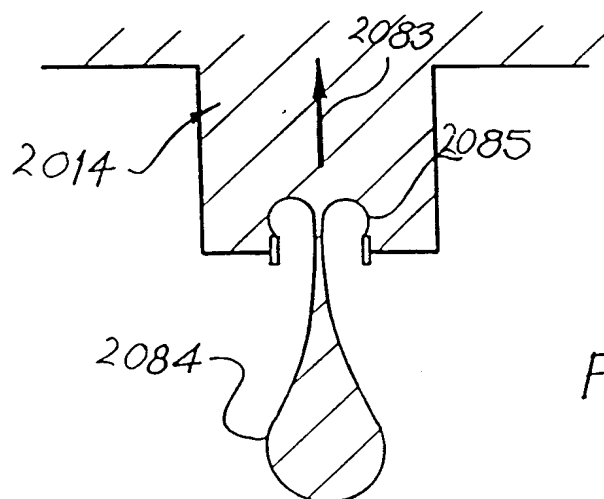
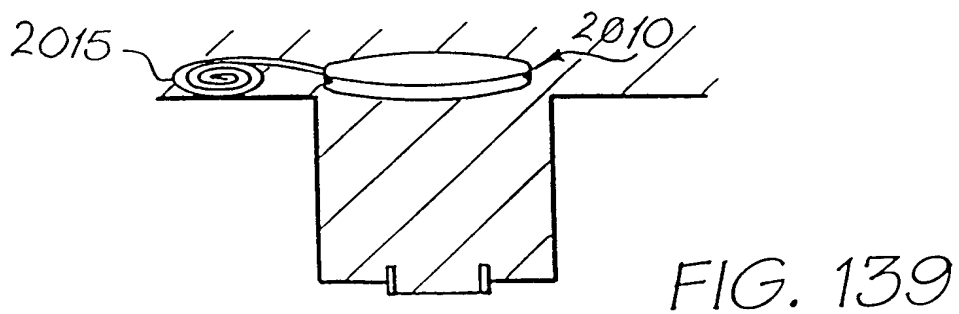
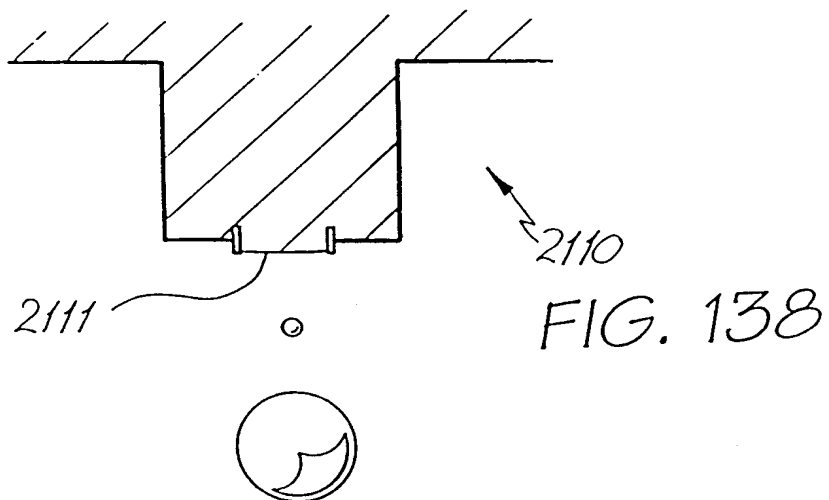
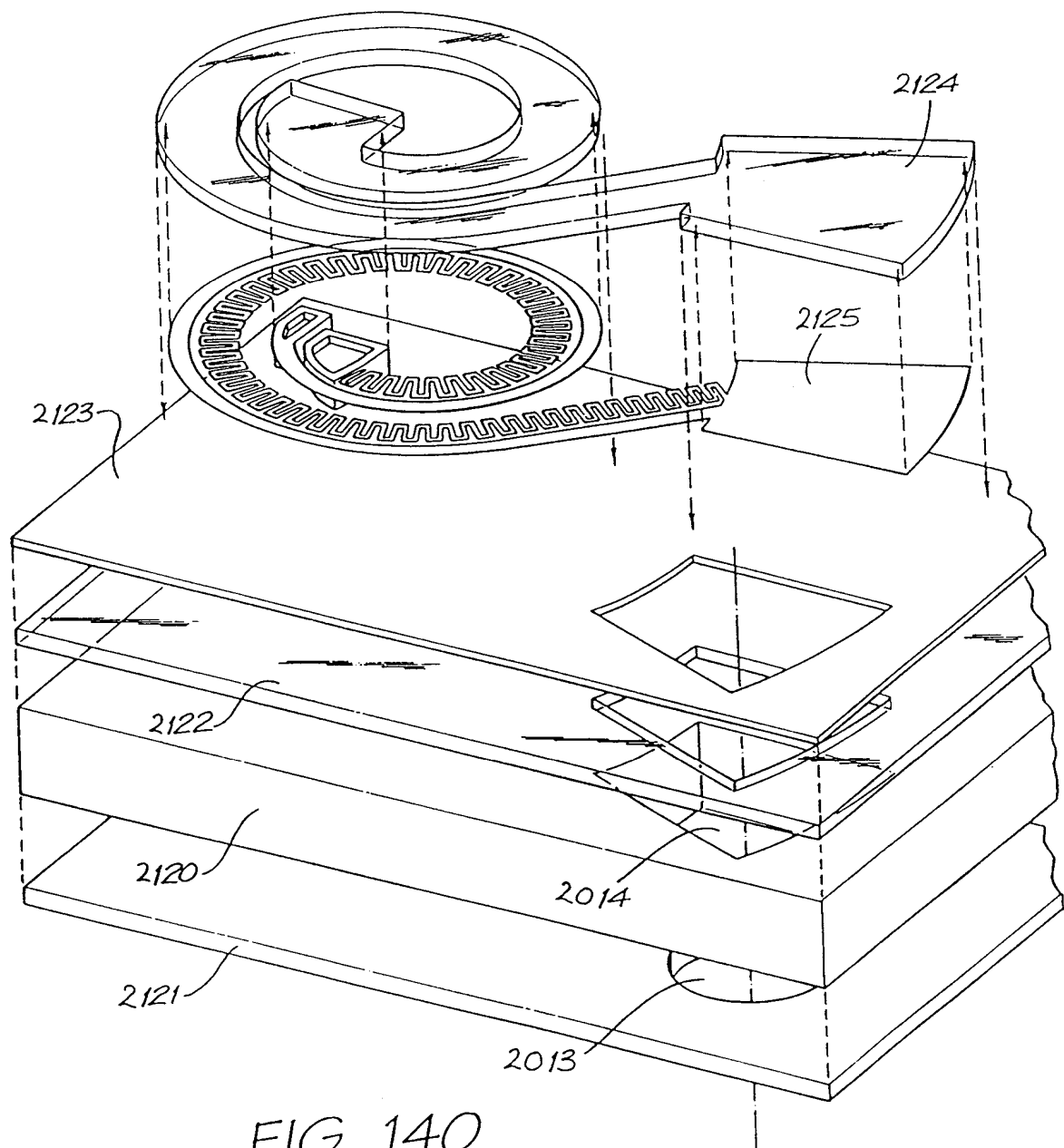


FIG. 137

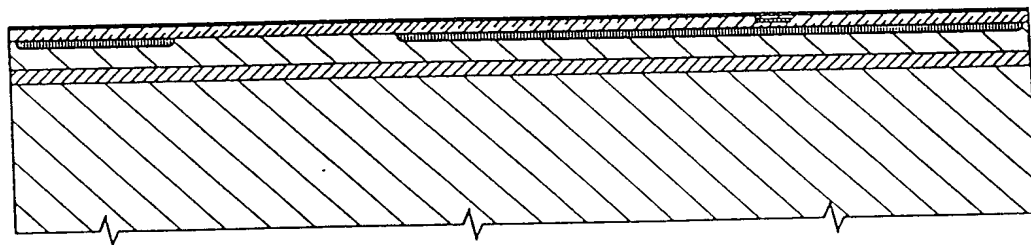
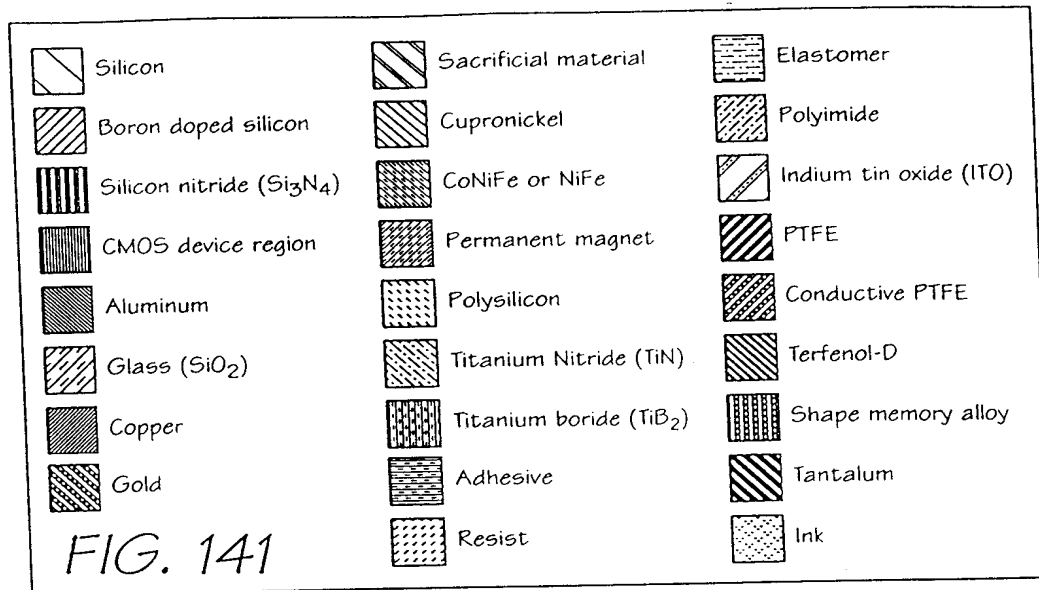
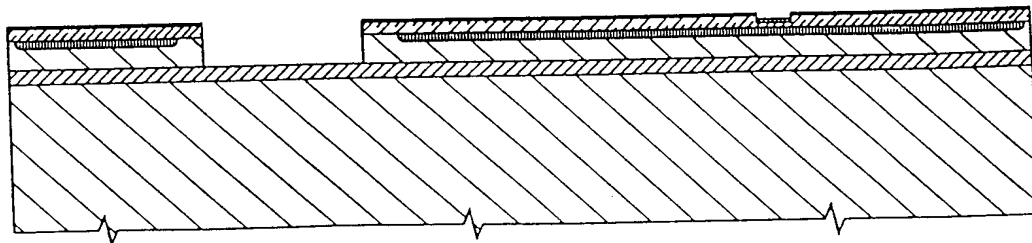
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**FIG. 142****FIG. 143**

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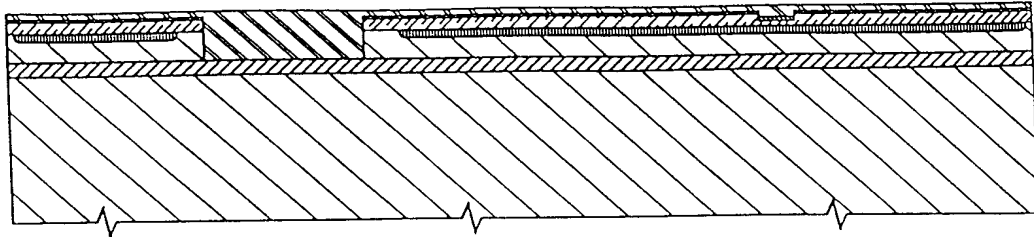


FIG. 144

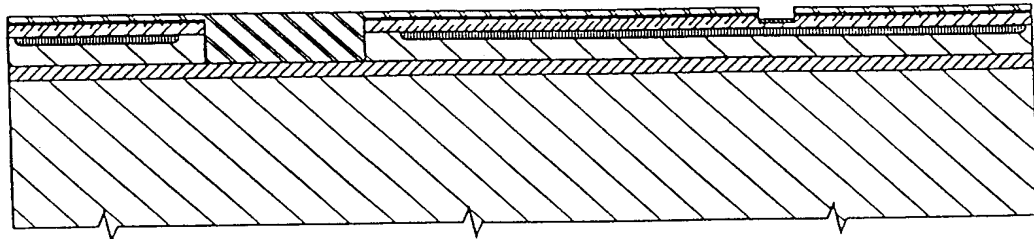


FIG. 145

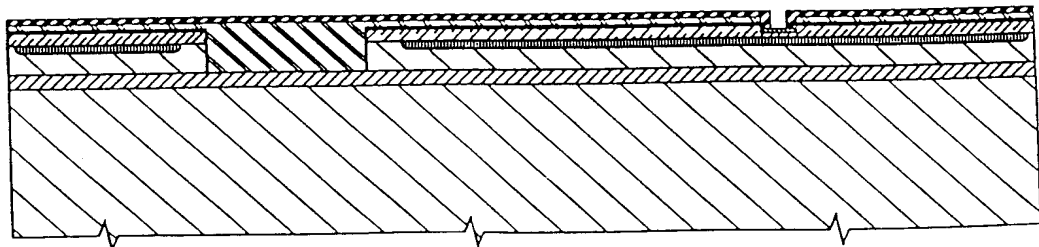


FIG. 146

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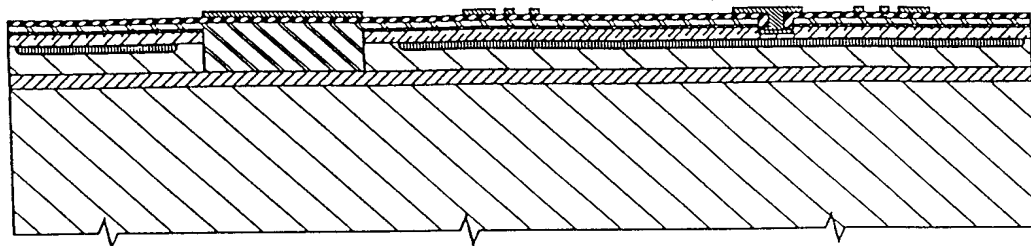


FIG. 147

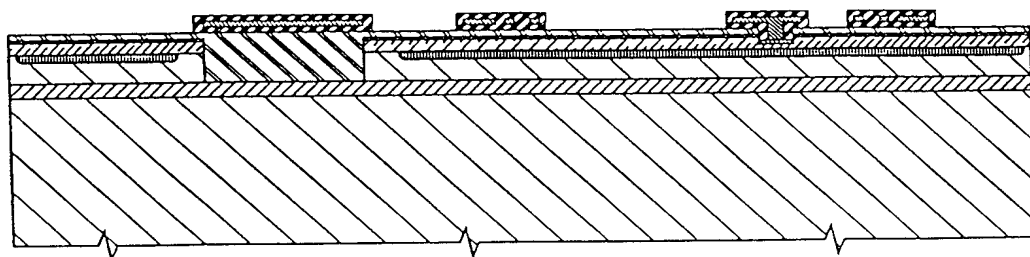


FIG. 148

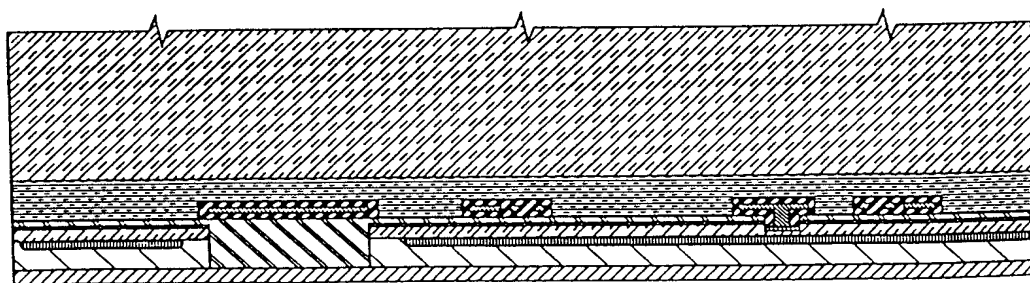


FIG. 149

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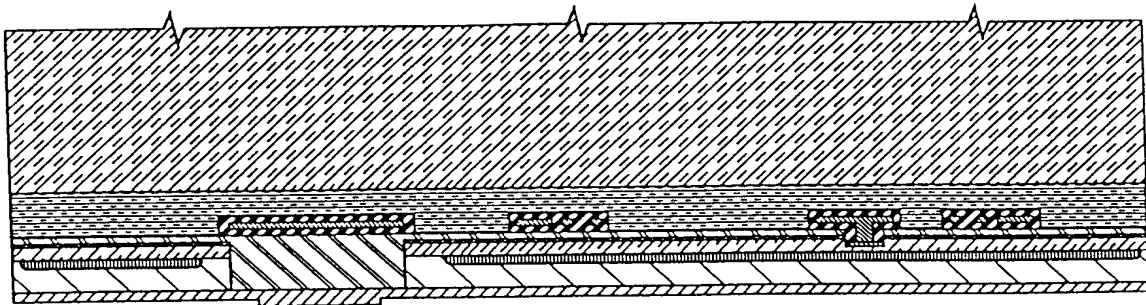


FIG. 150

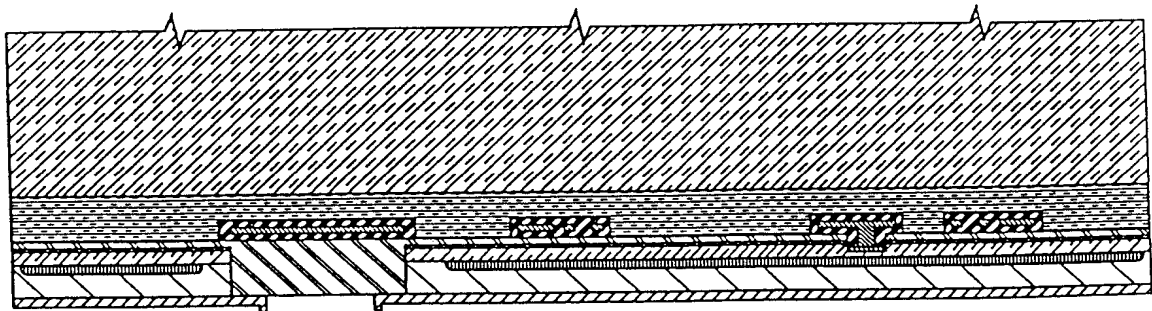


FIG. 151

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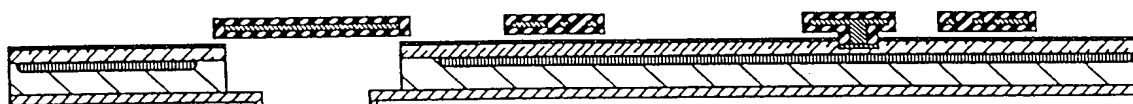


FIG. 152

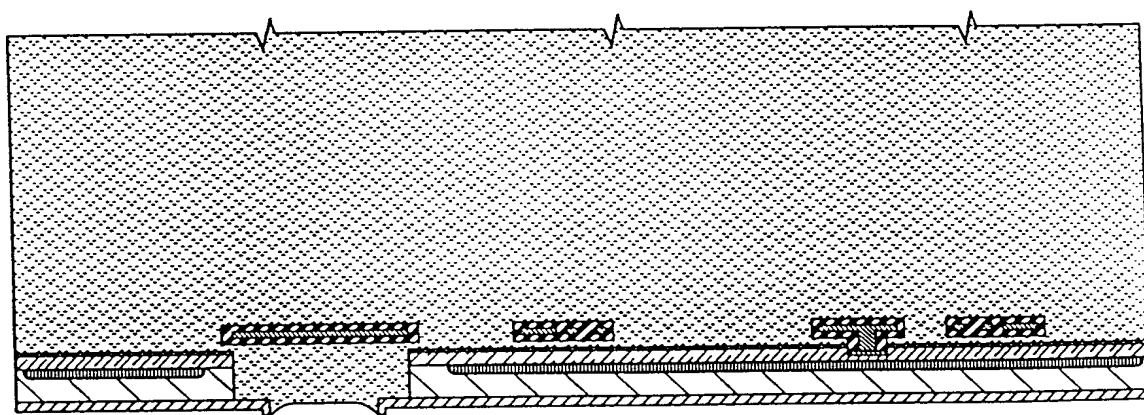


FIG. 153

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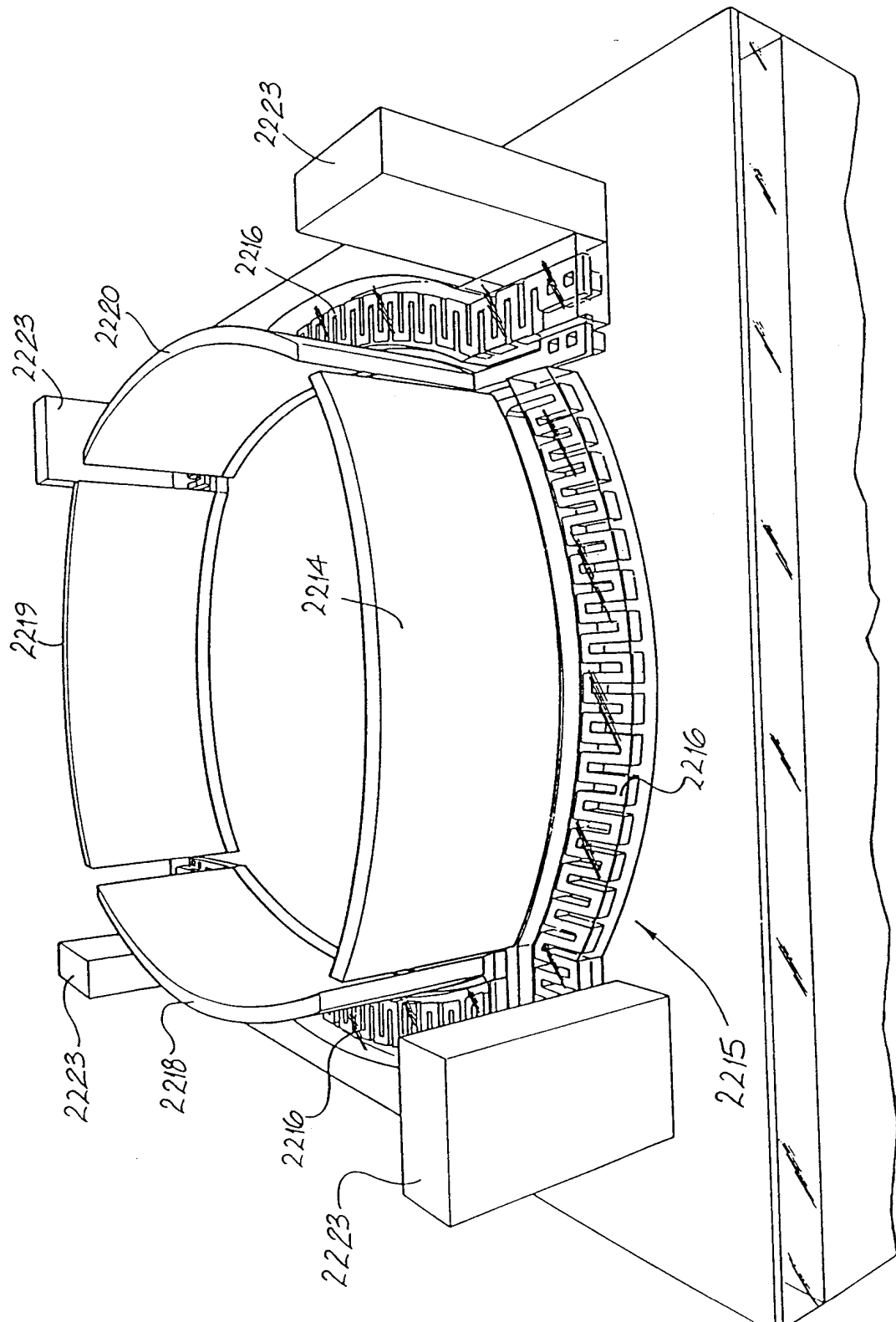


FIG. 154

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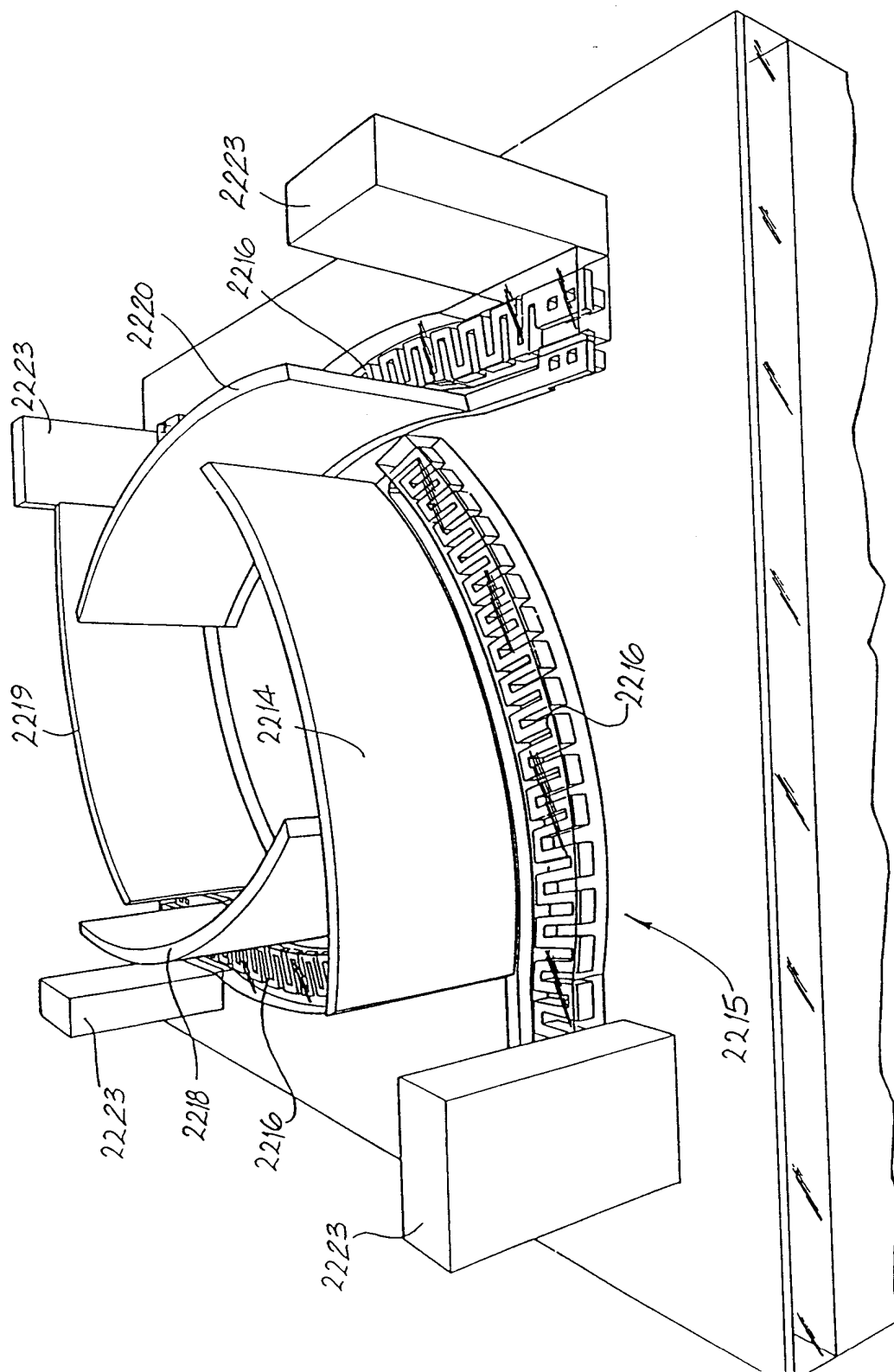


FIG. 155

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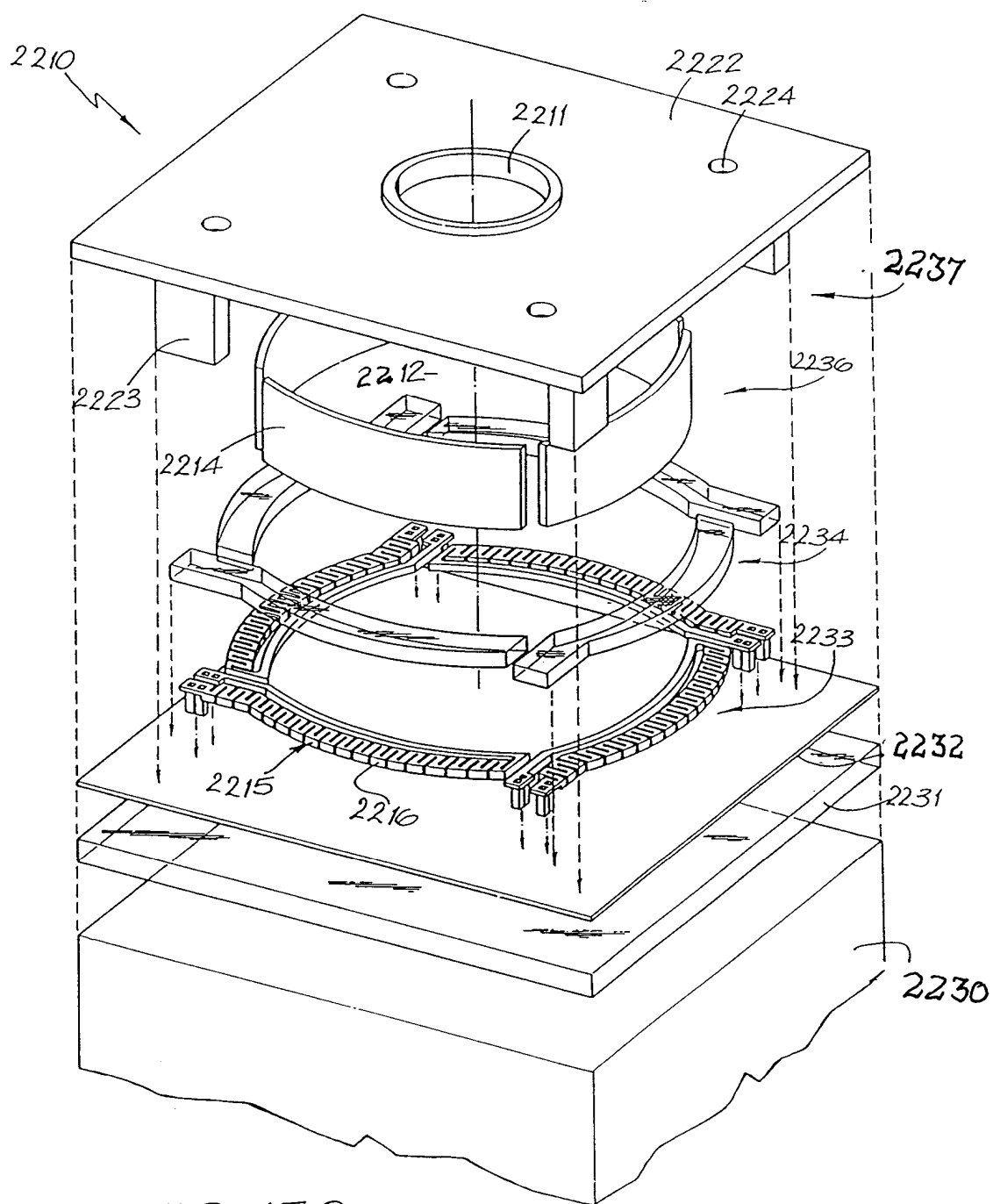


FIG. 156

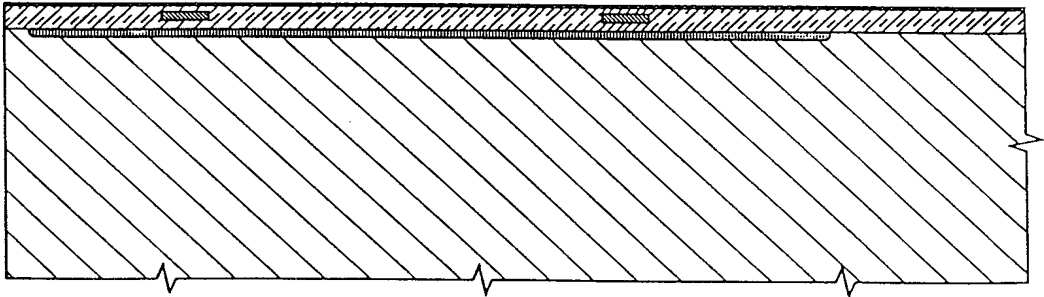
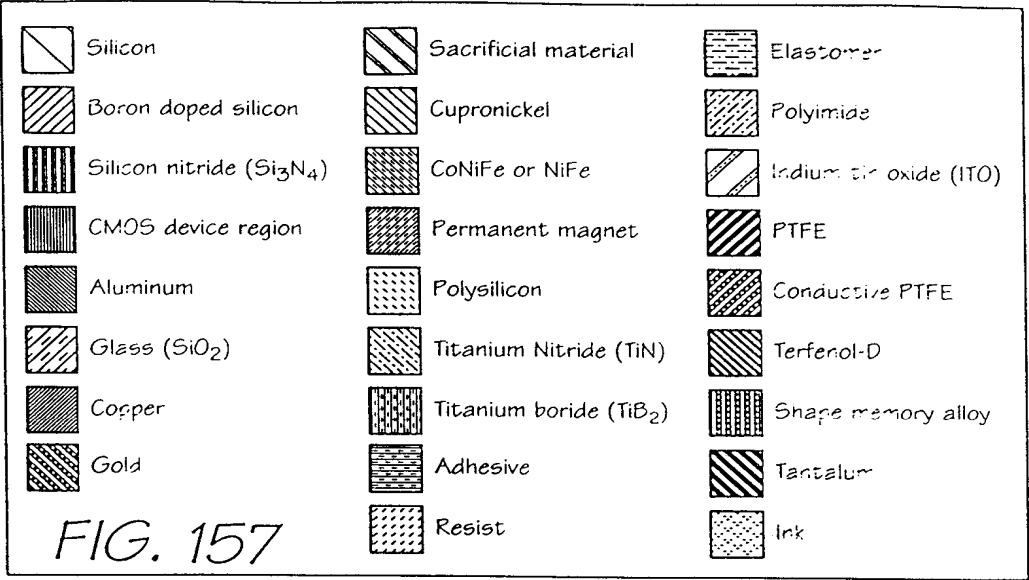


FIG. 158

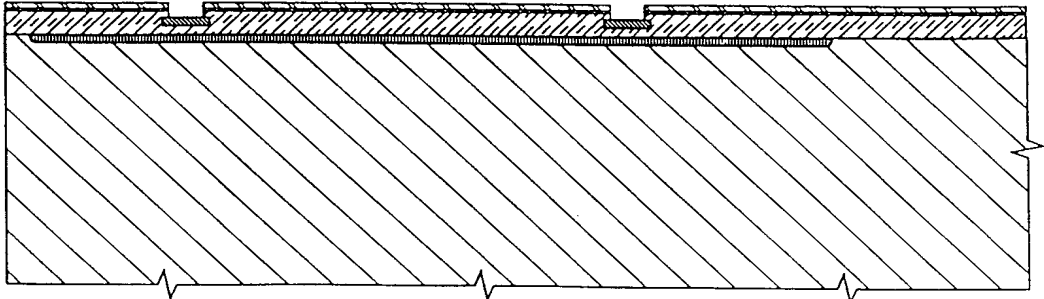


FIG. 159

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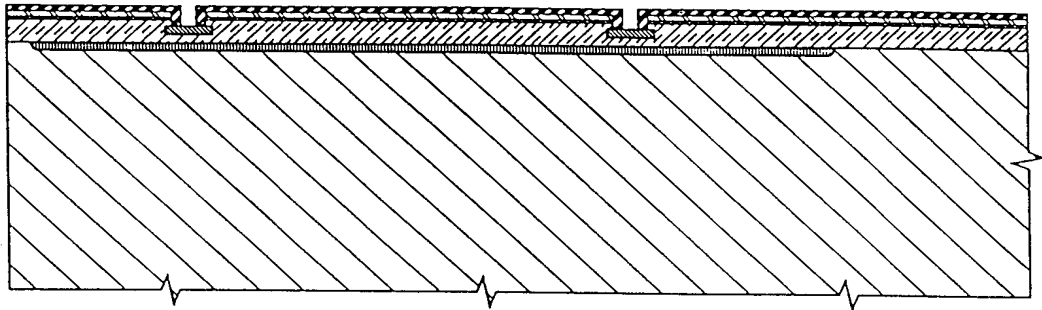


FIG. 160

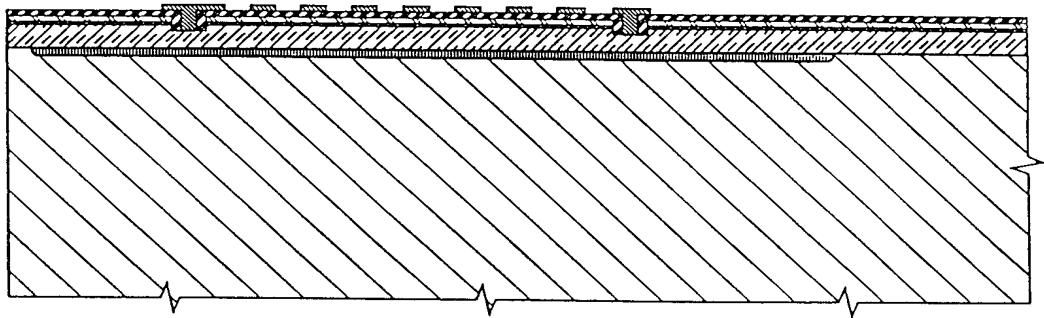


FIG. 161

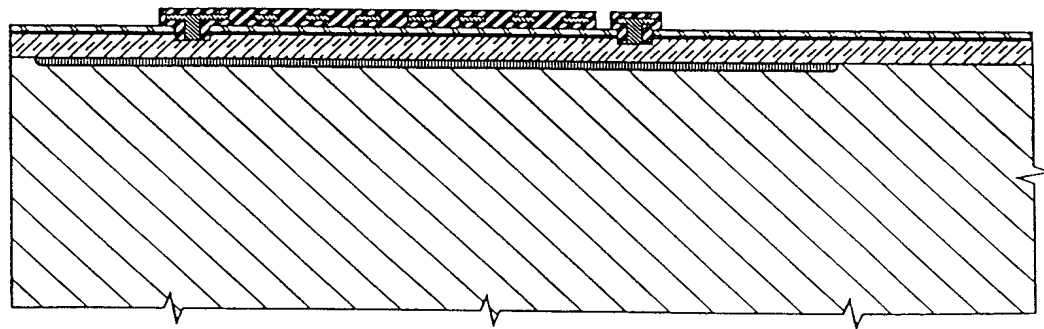


FIG. 162

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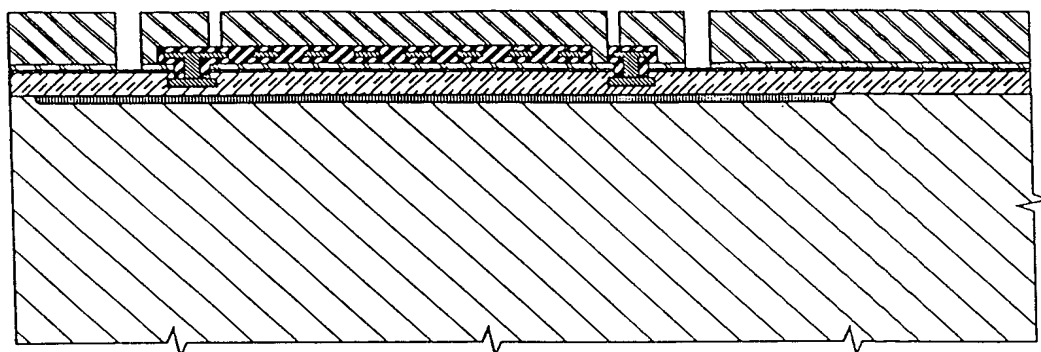


FIG. 163

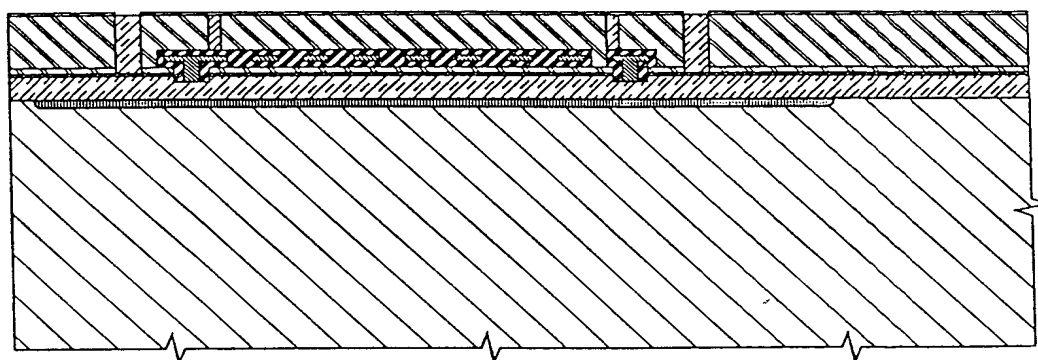


FIG. 164

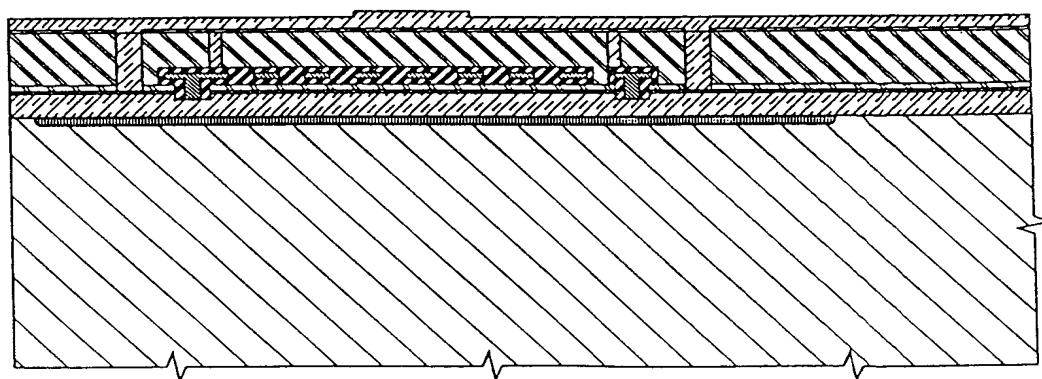


FIG. 165

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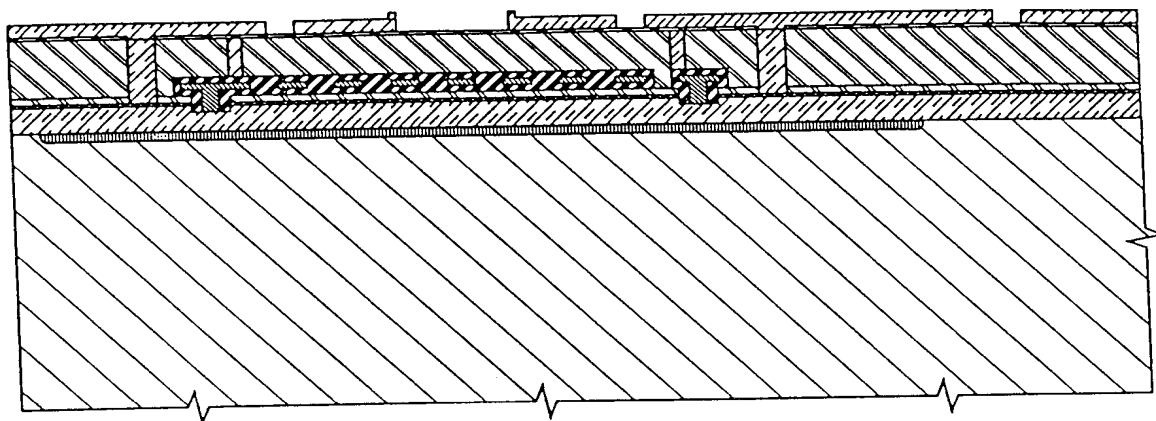


FIG. 166

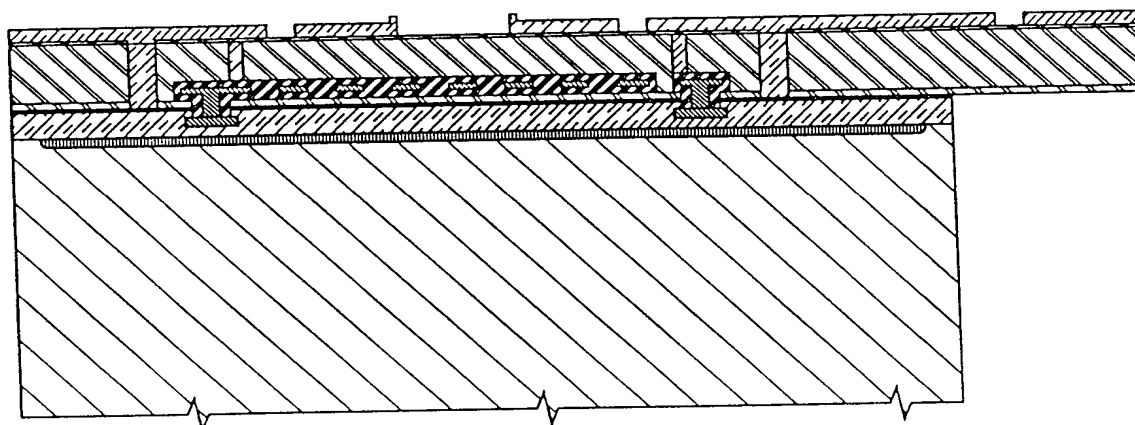


FIG. 167

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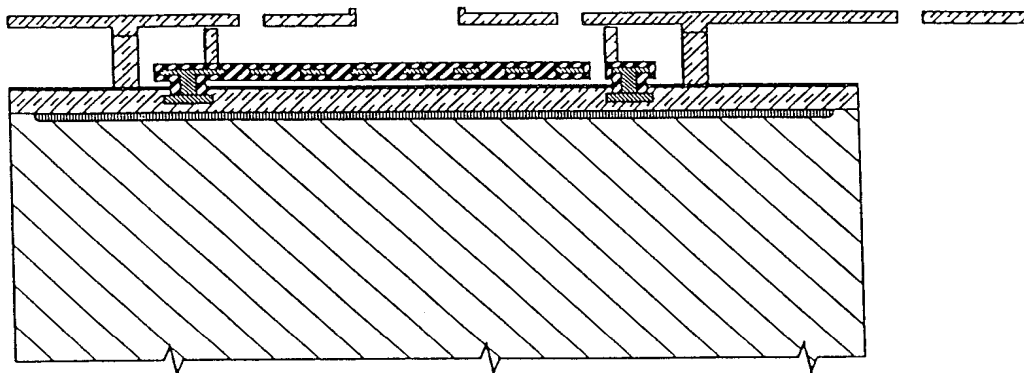


FIG. 168

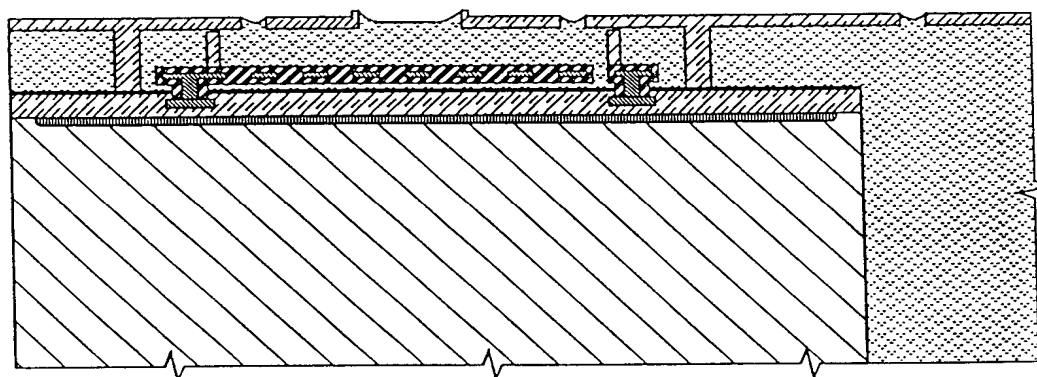
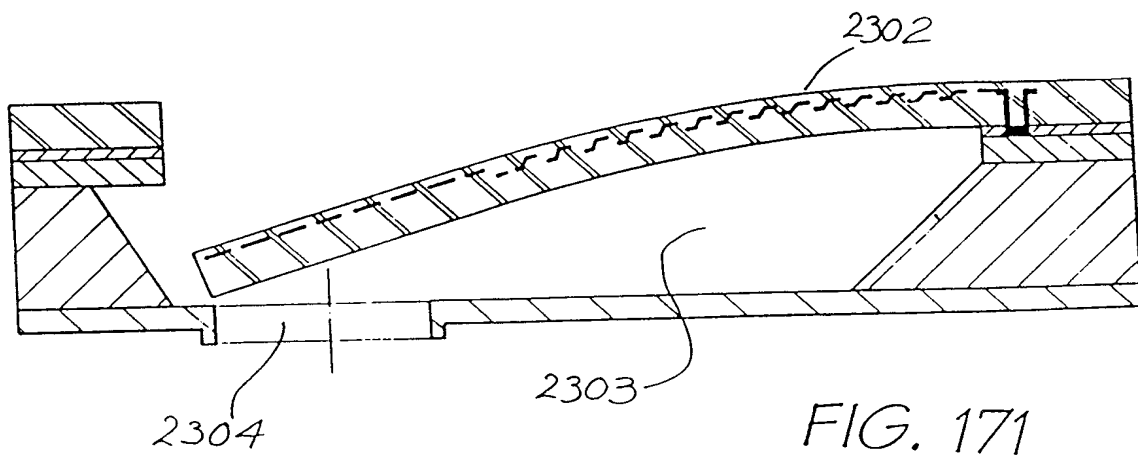
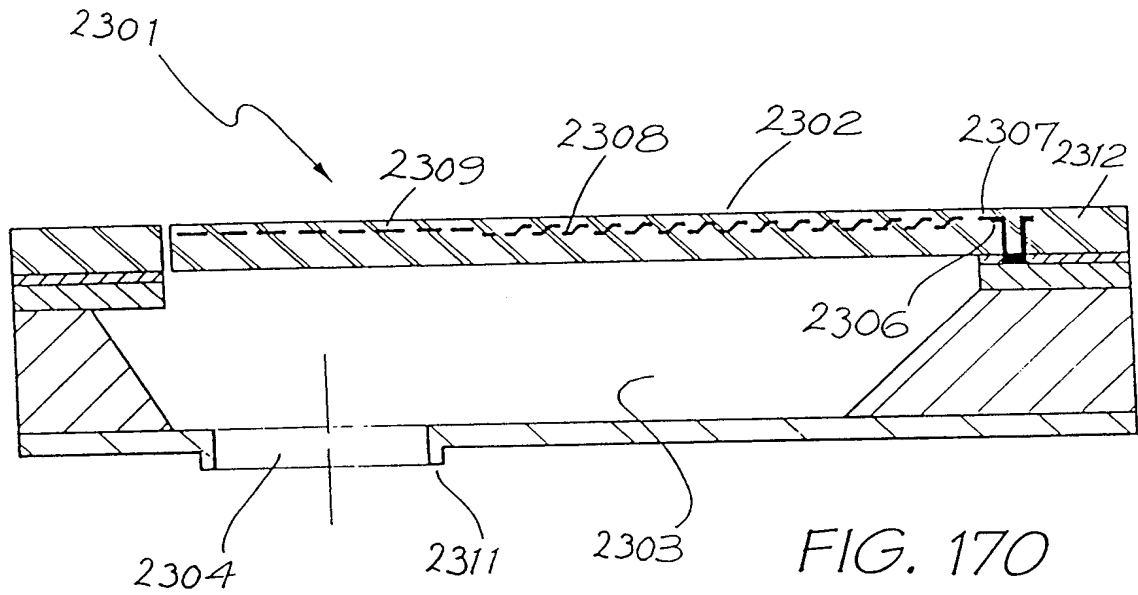


FIG. 169

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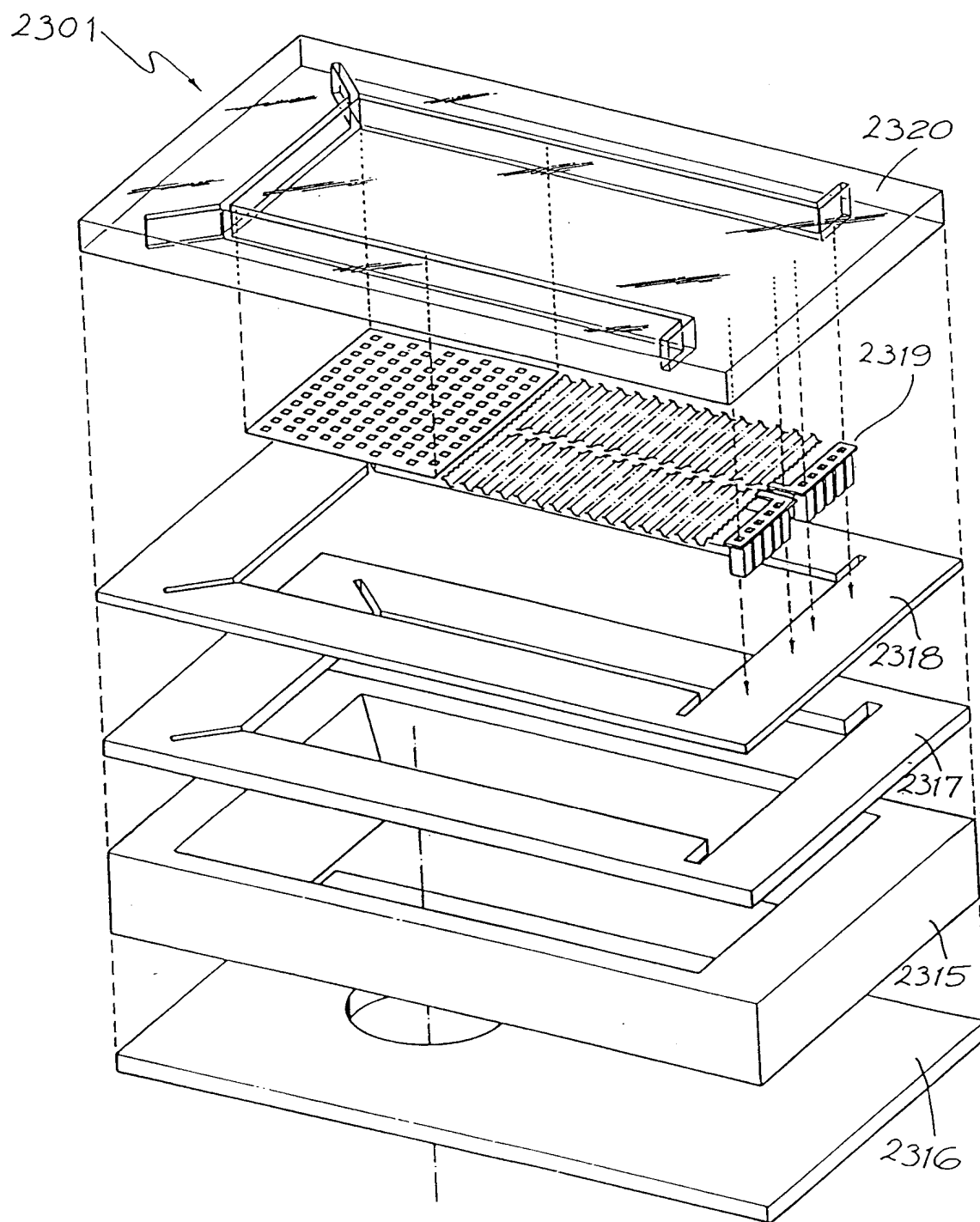


FIG. 172

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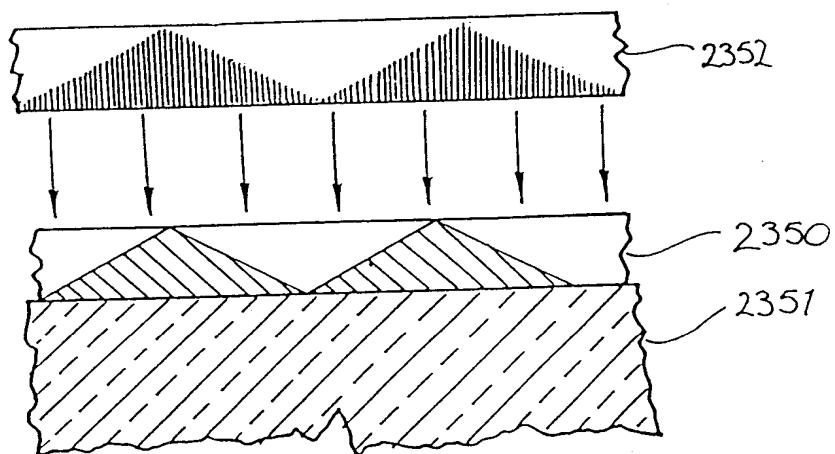


FIG. 173

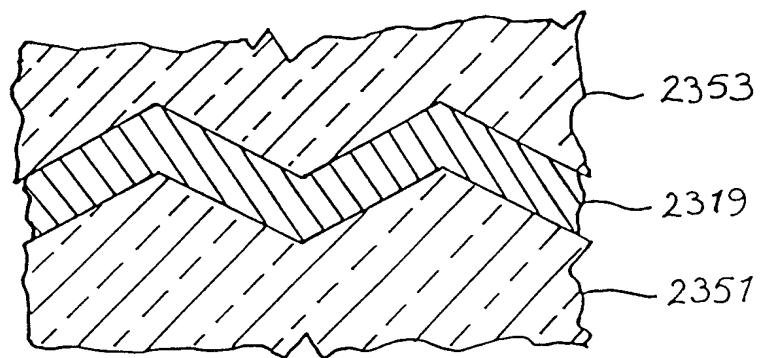


FIG. 174

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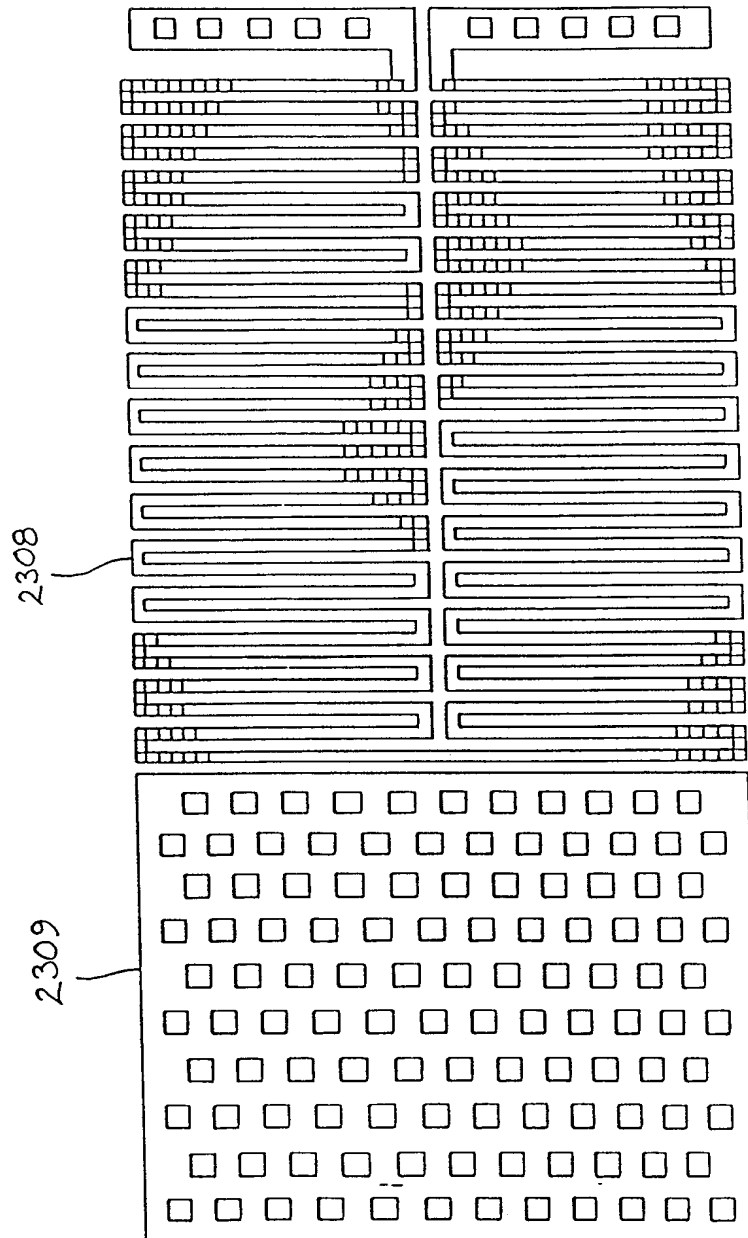
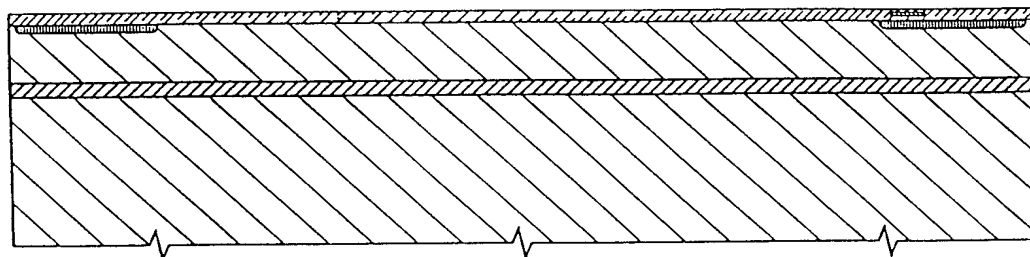
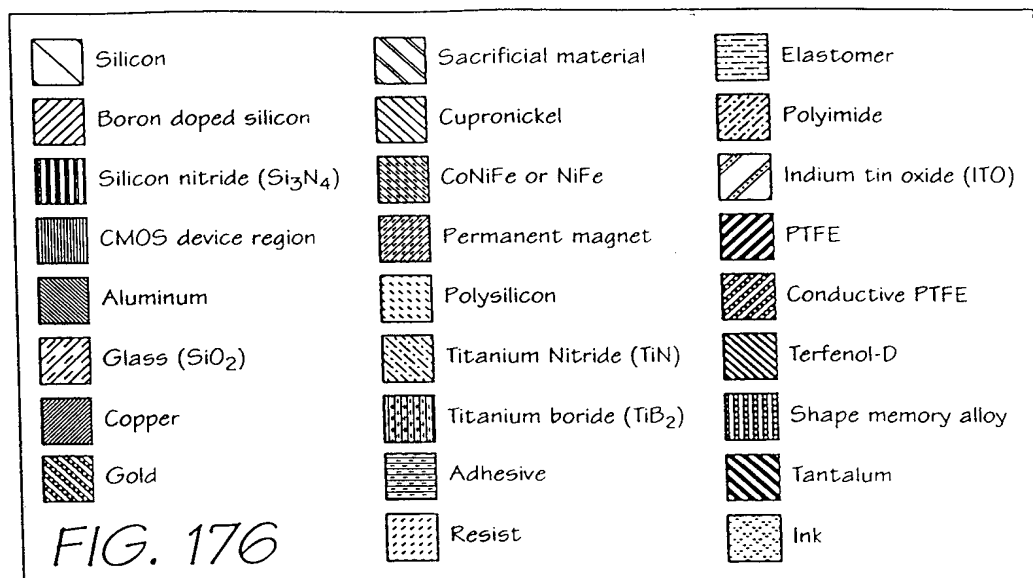
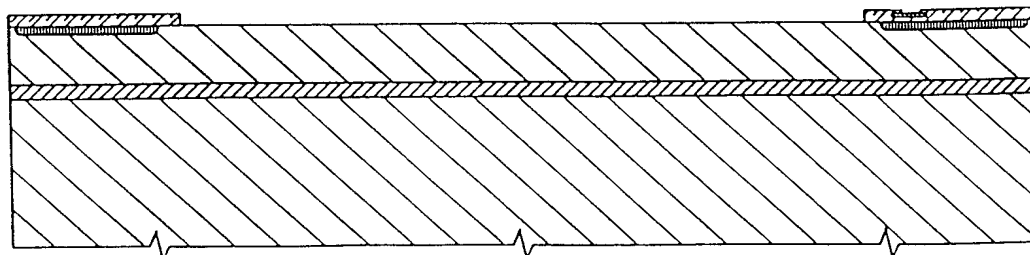


FIG. 175

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*FIG. 177**FIG. 178*

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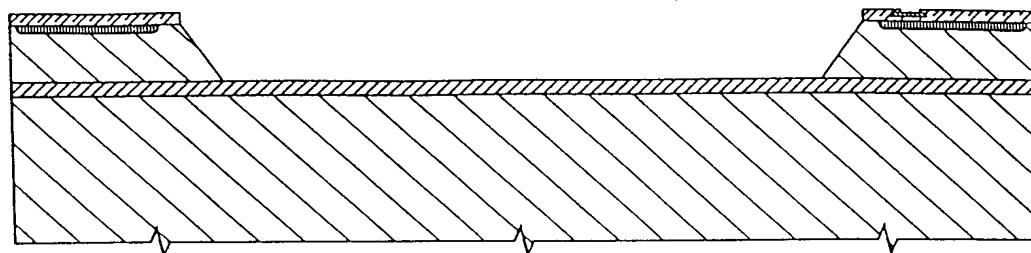


FIG. 179

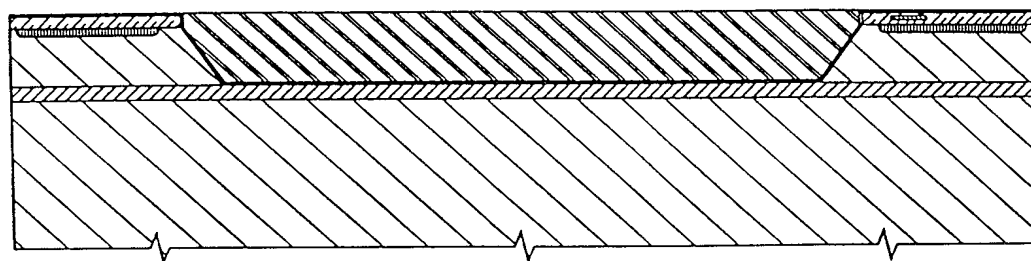


FIG. 180

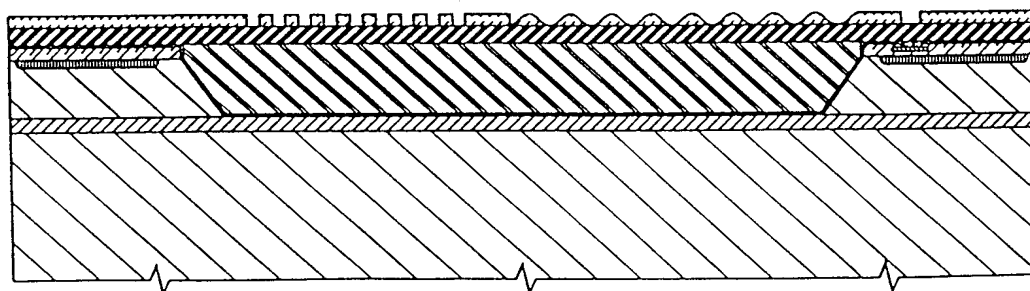


FIG. 181

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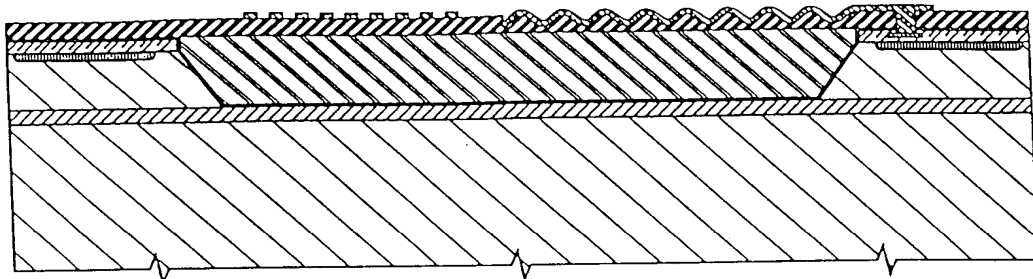


FIG. 182

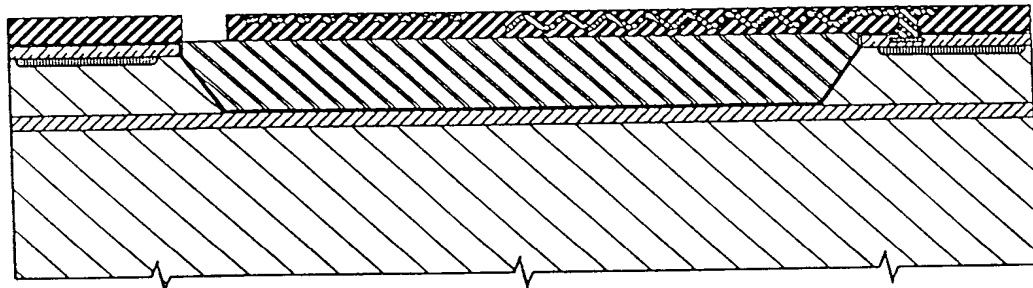


FIG. 183

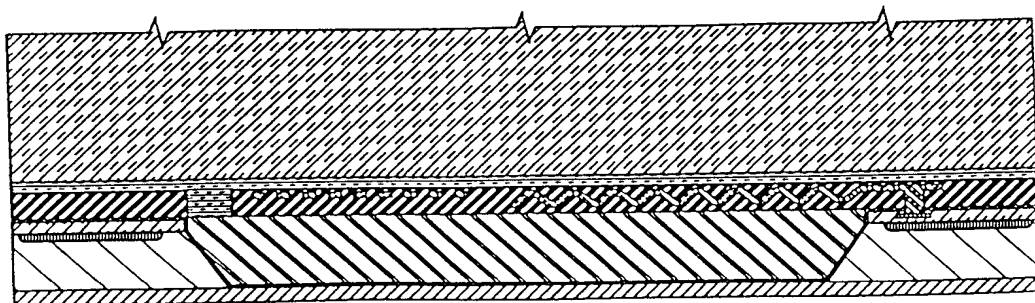


FIG. 184

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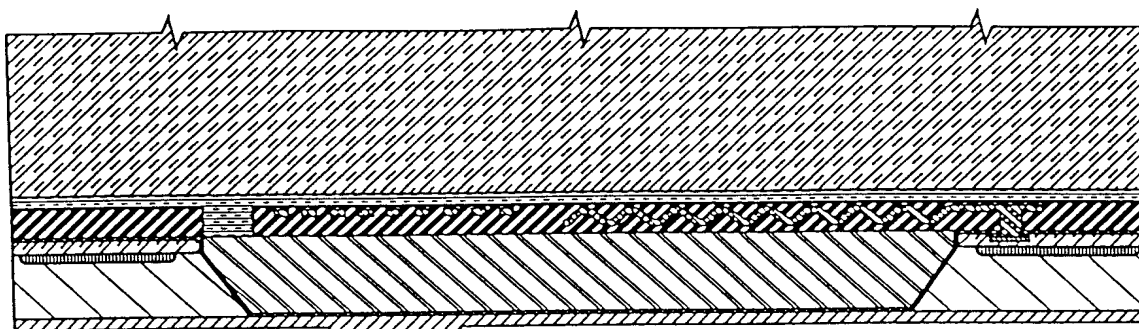


FIG. 185

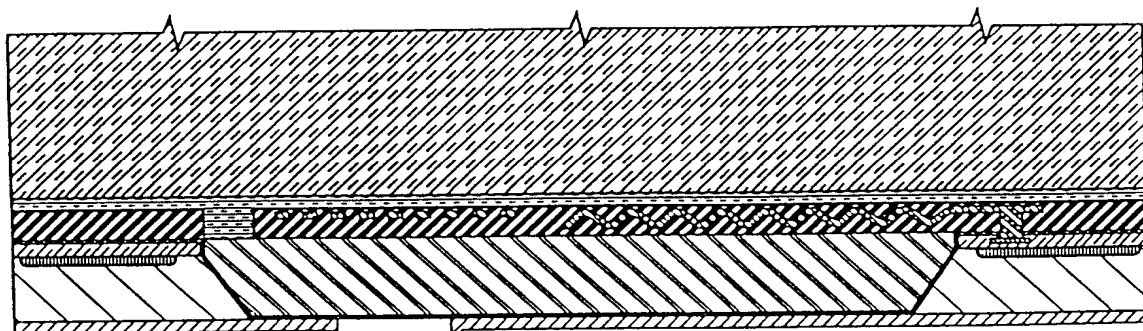


FIG. 186

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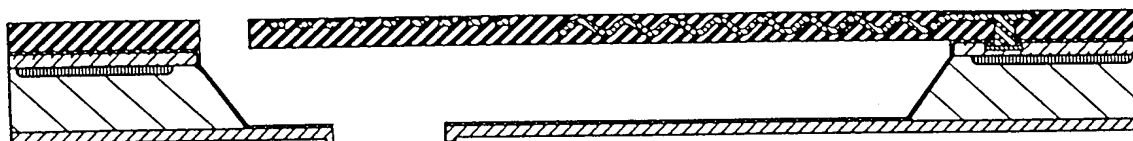


FIG. 187

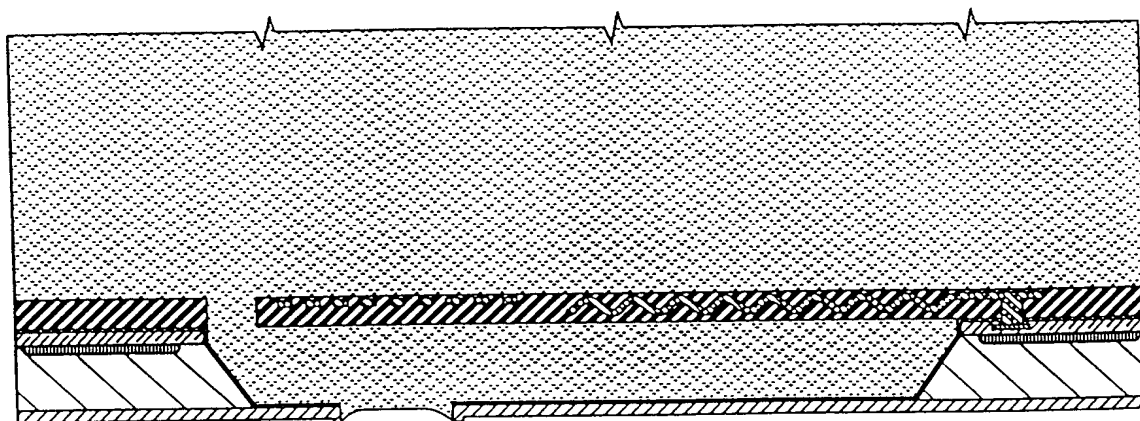


FIG. 188

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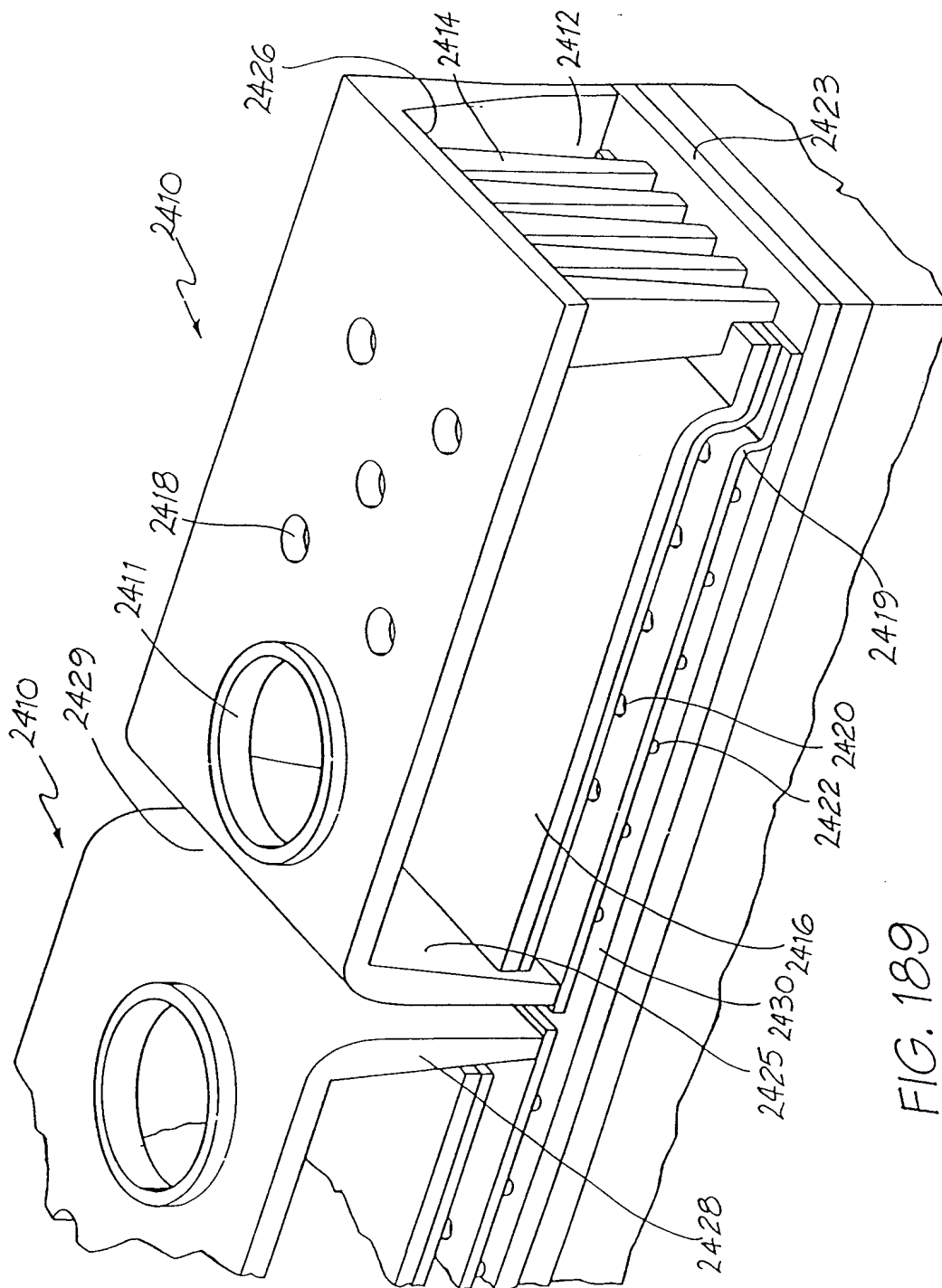


FIG. 189

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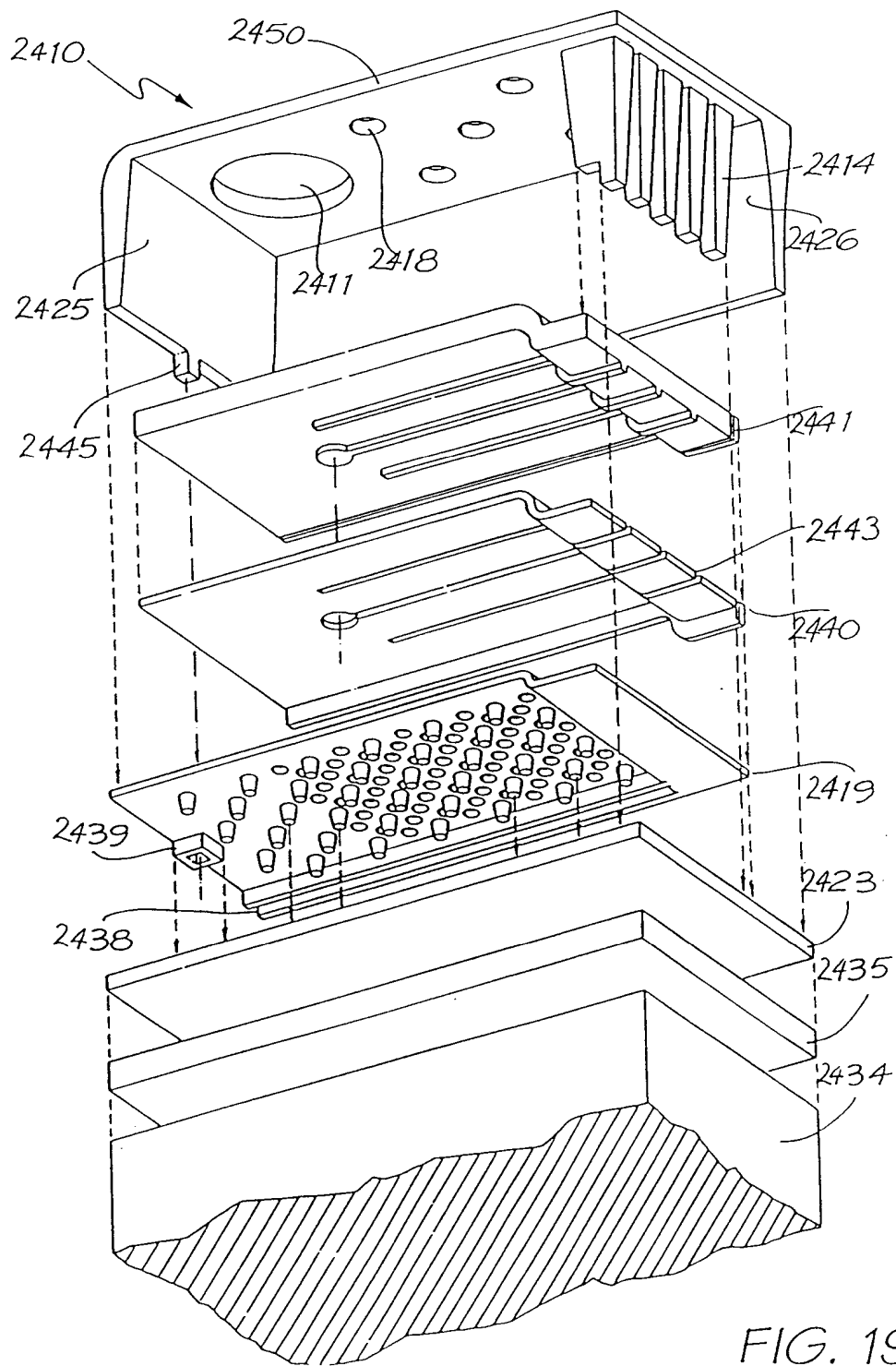
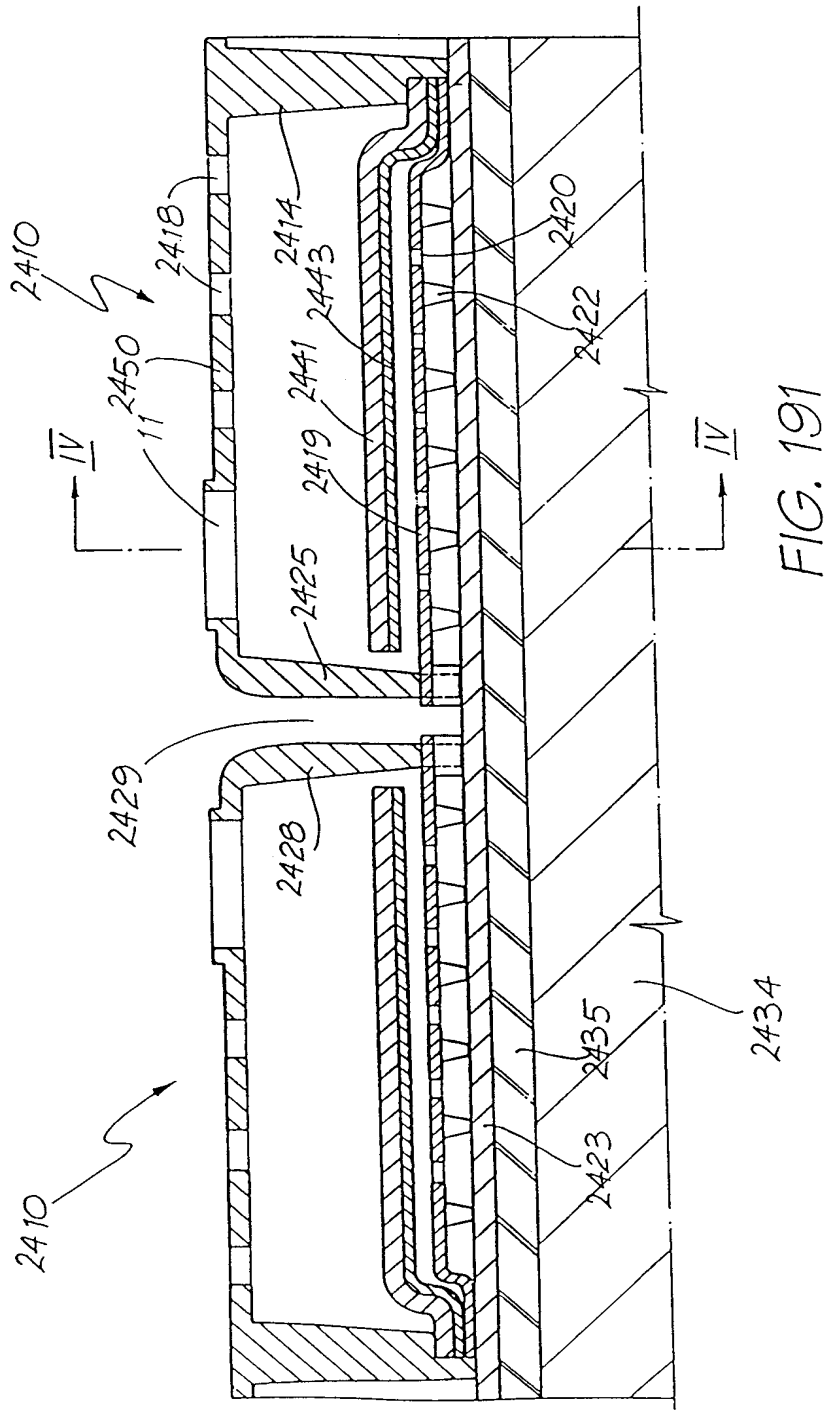


FIG. 190

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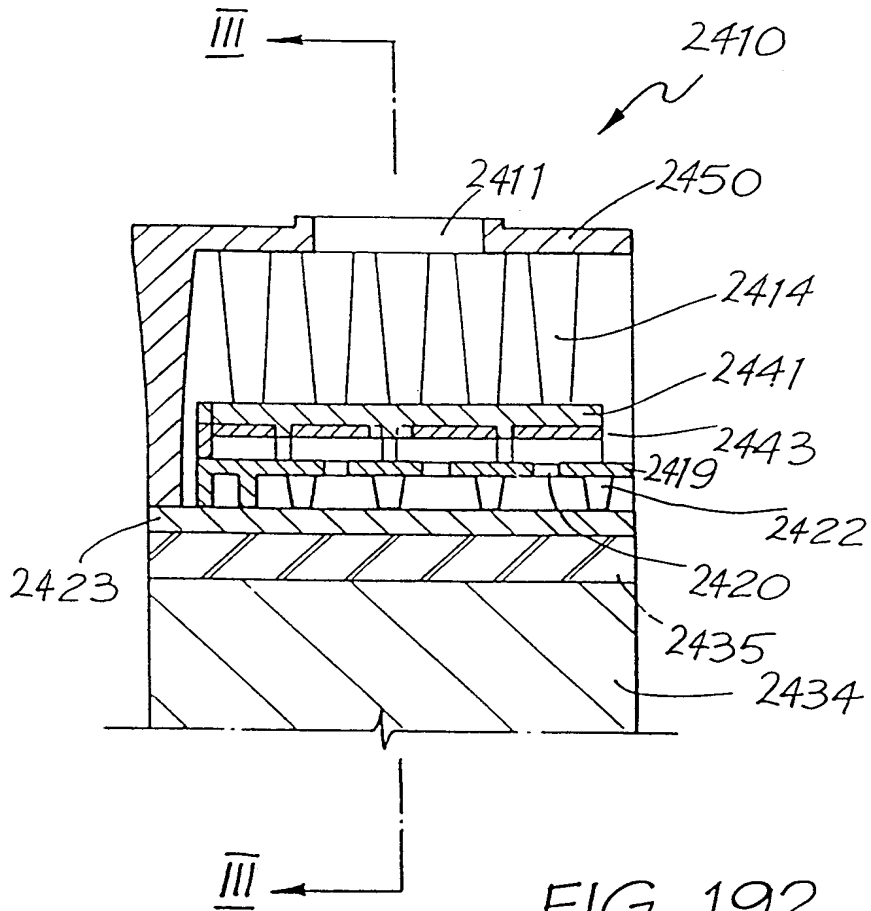
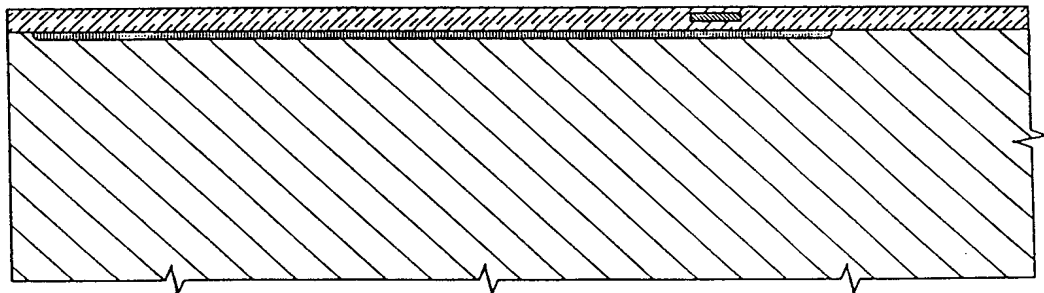
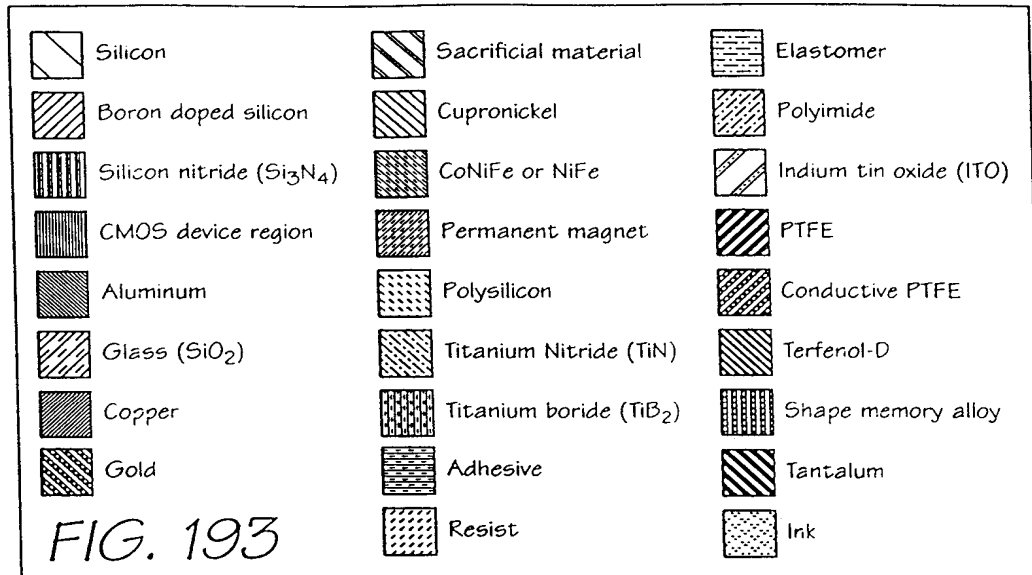
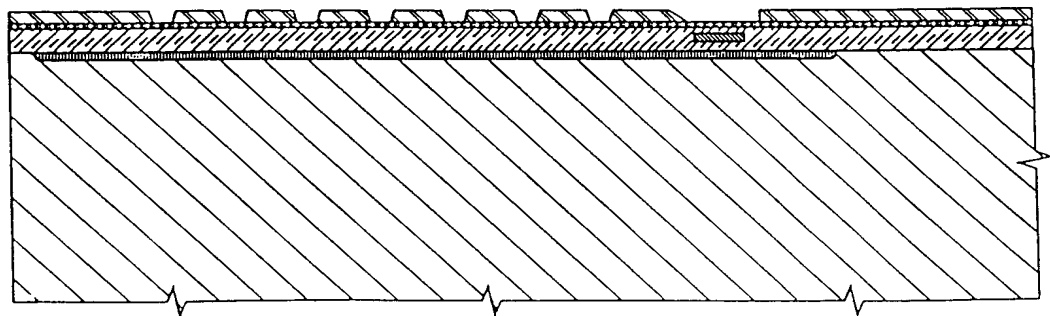


FIG. 192

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*FIG. 194**FIG. 195*

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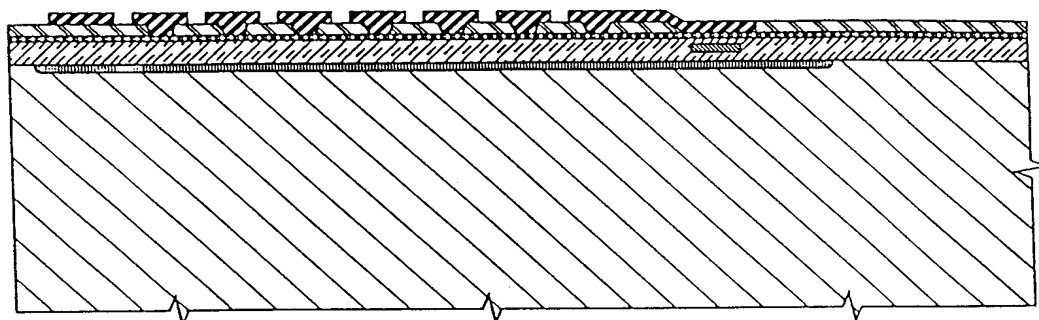


FIG. 196

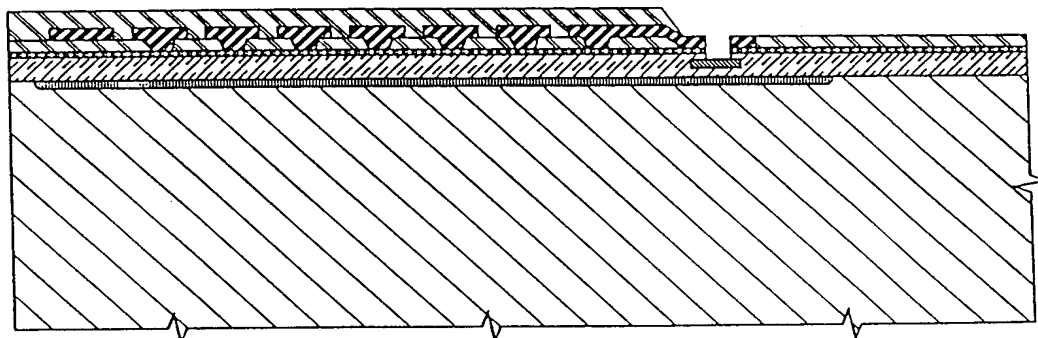


FIG. 197

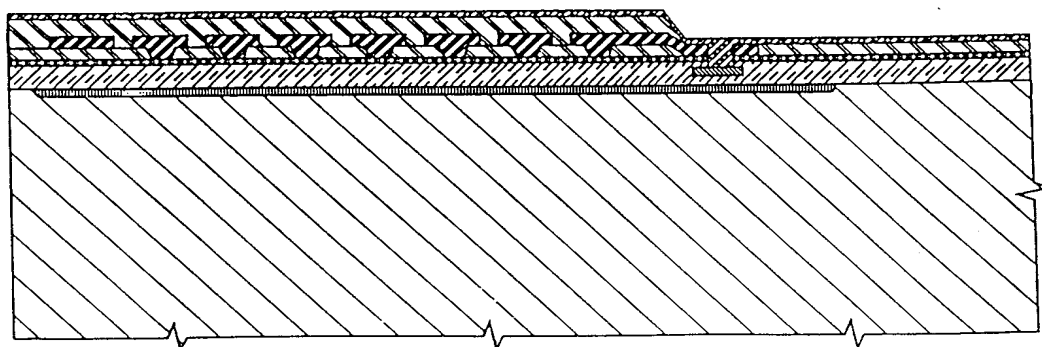


FIG. 198

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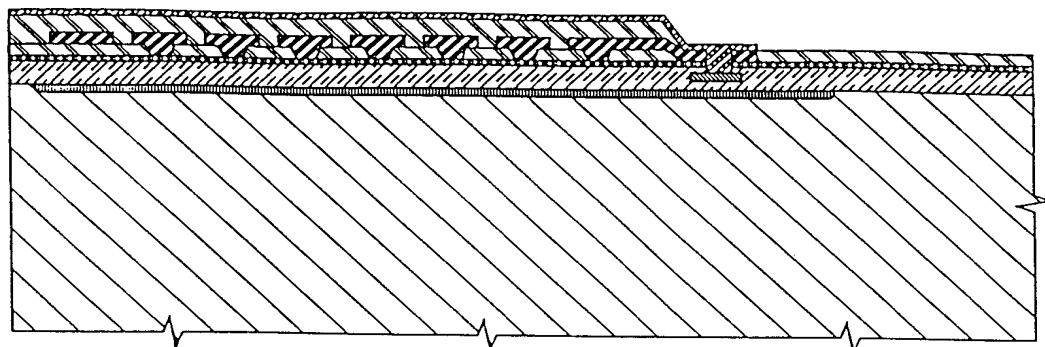


FIG. 199

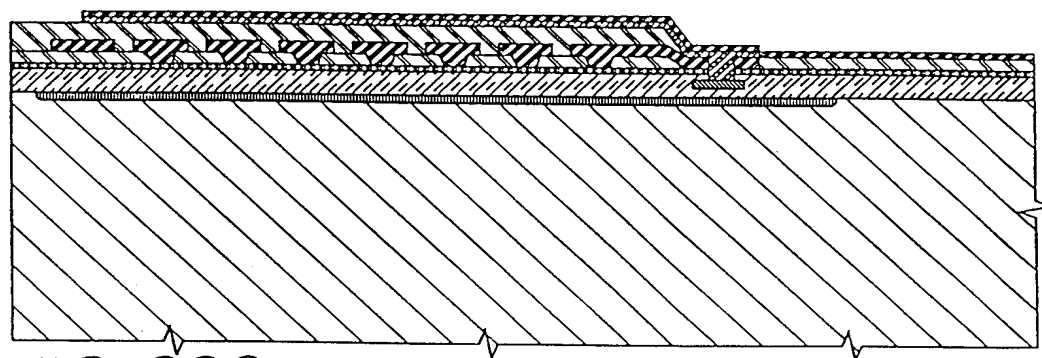


FIG. 200

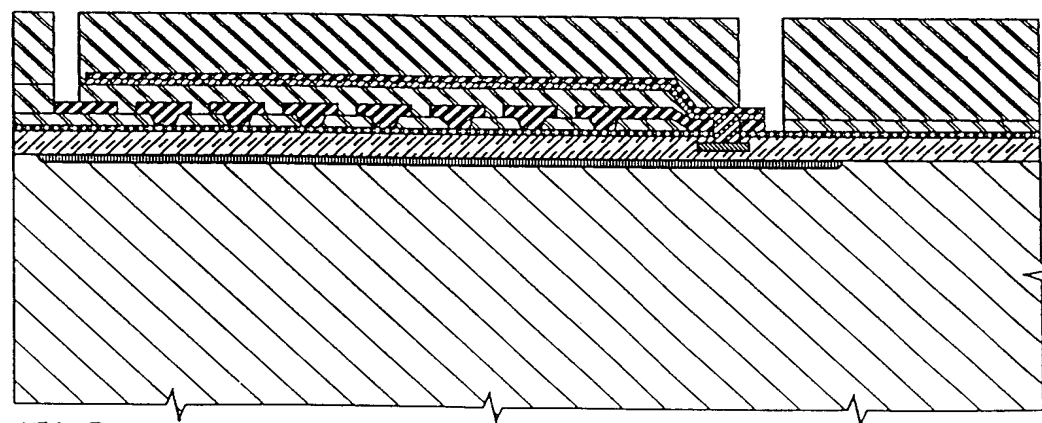


FIG. 201

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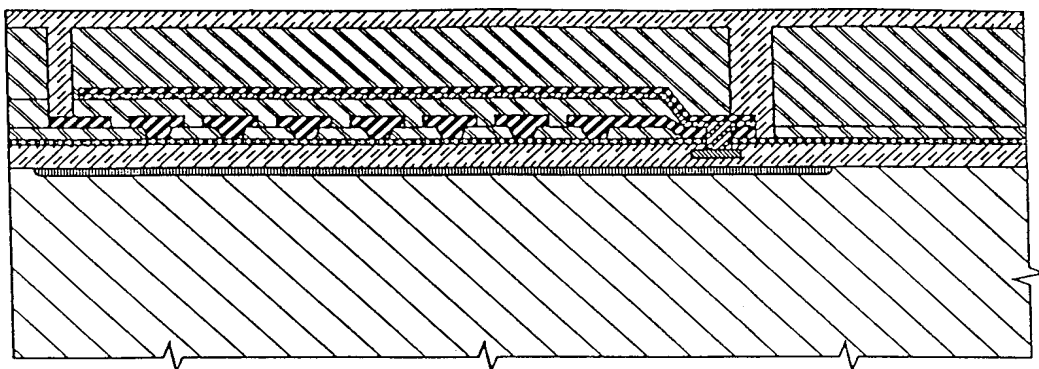


FIG. 202

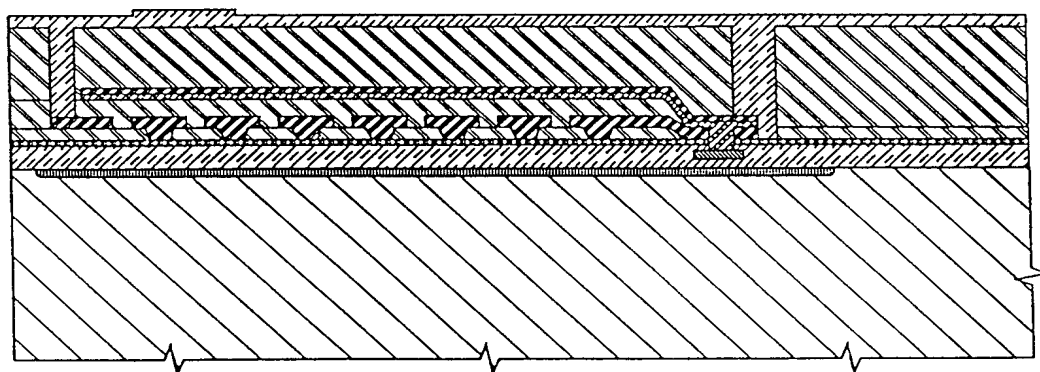


FIG. 203

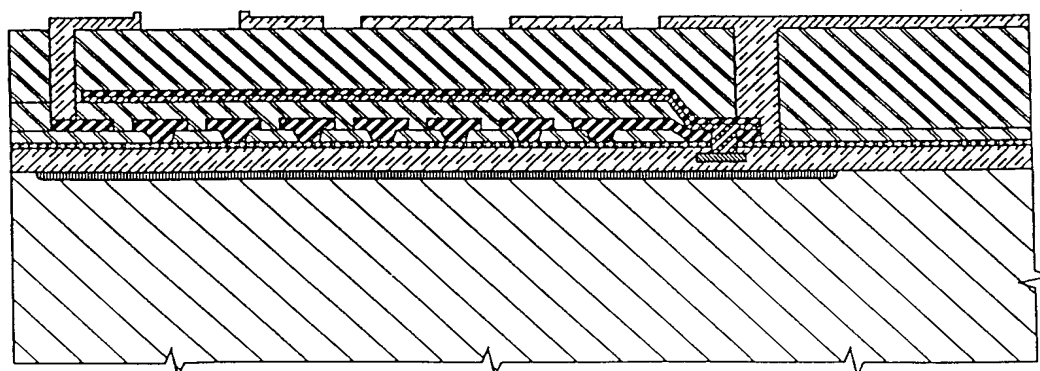


FIG. 204

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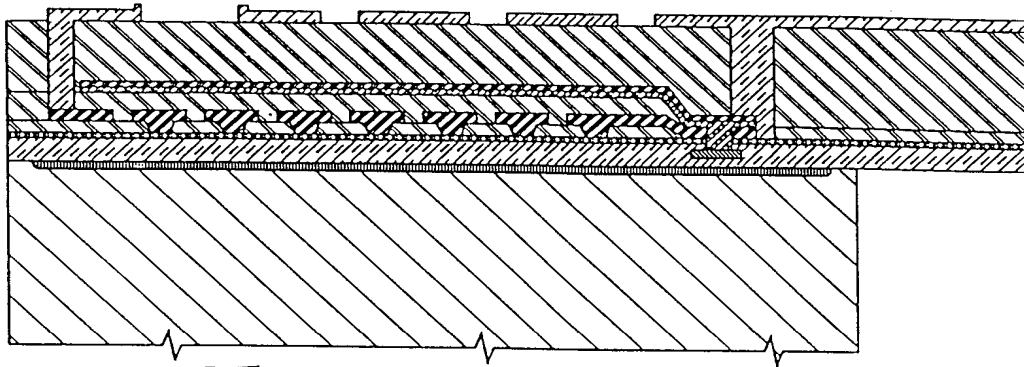


FIG. 205

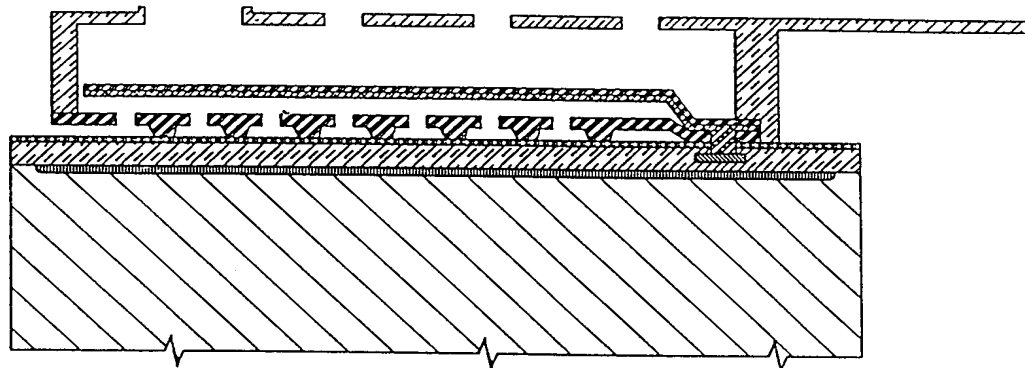


FIG. 206

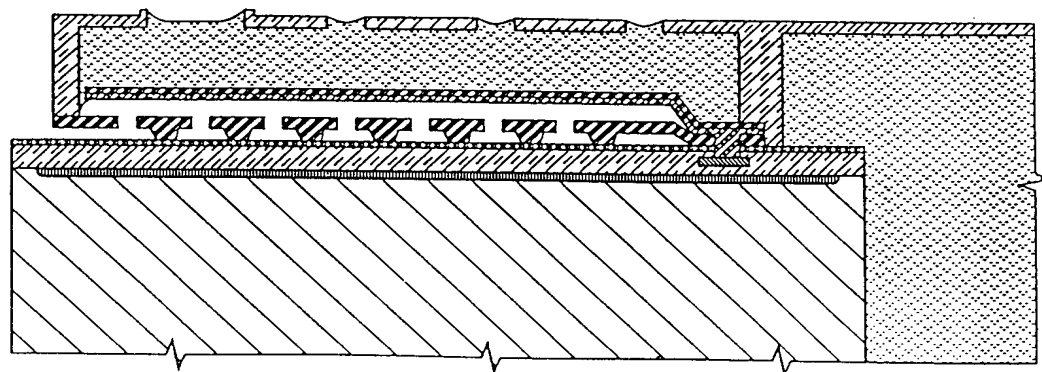


FIG. 207

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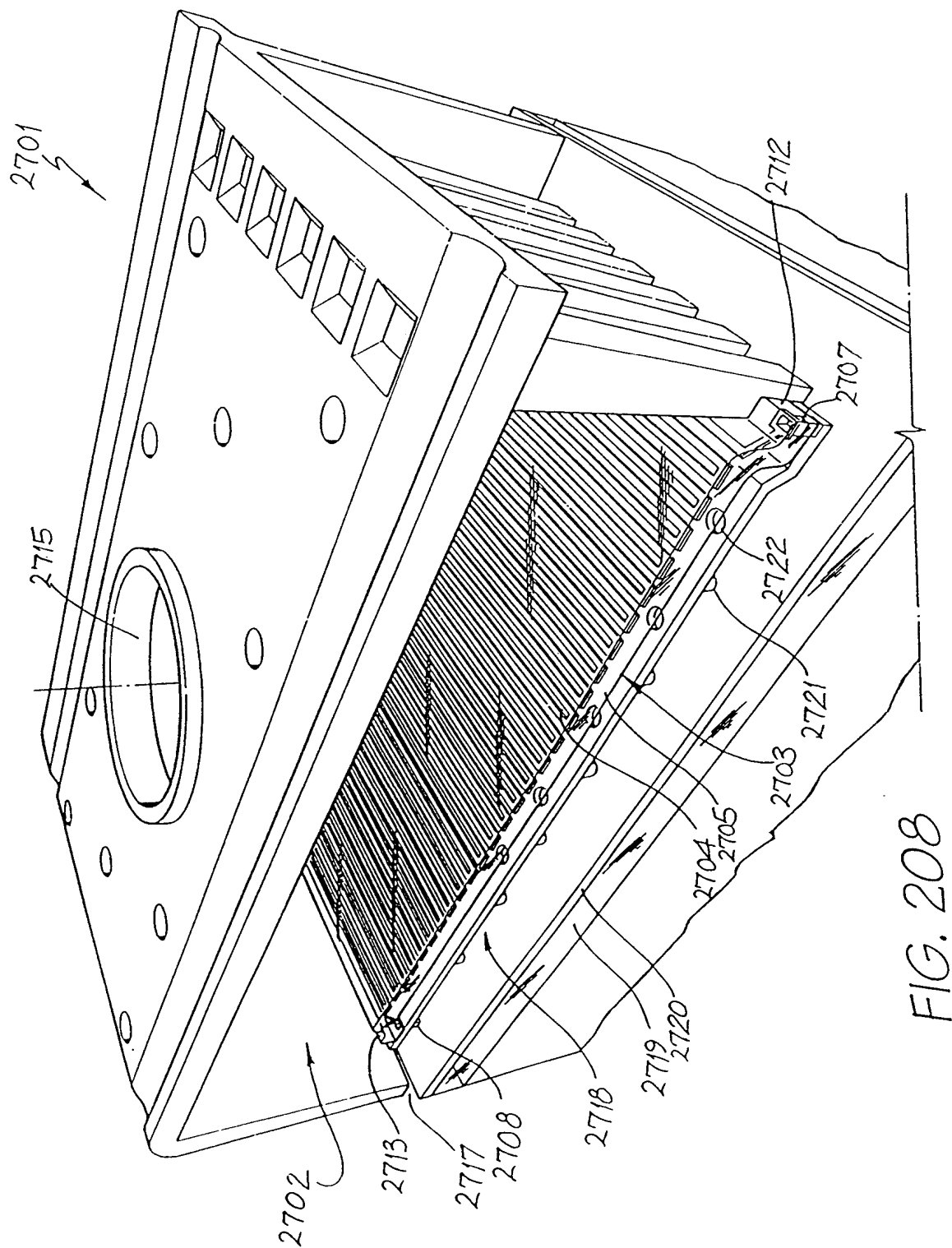


FIG. 208

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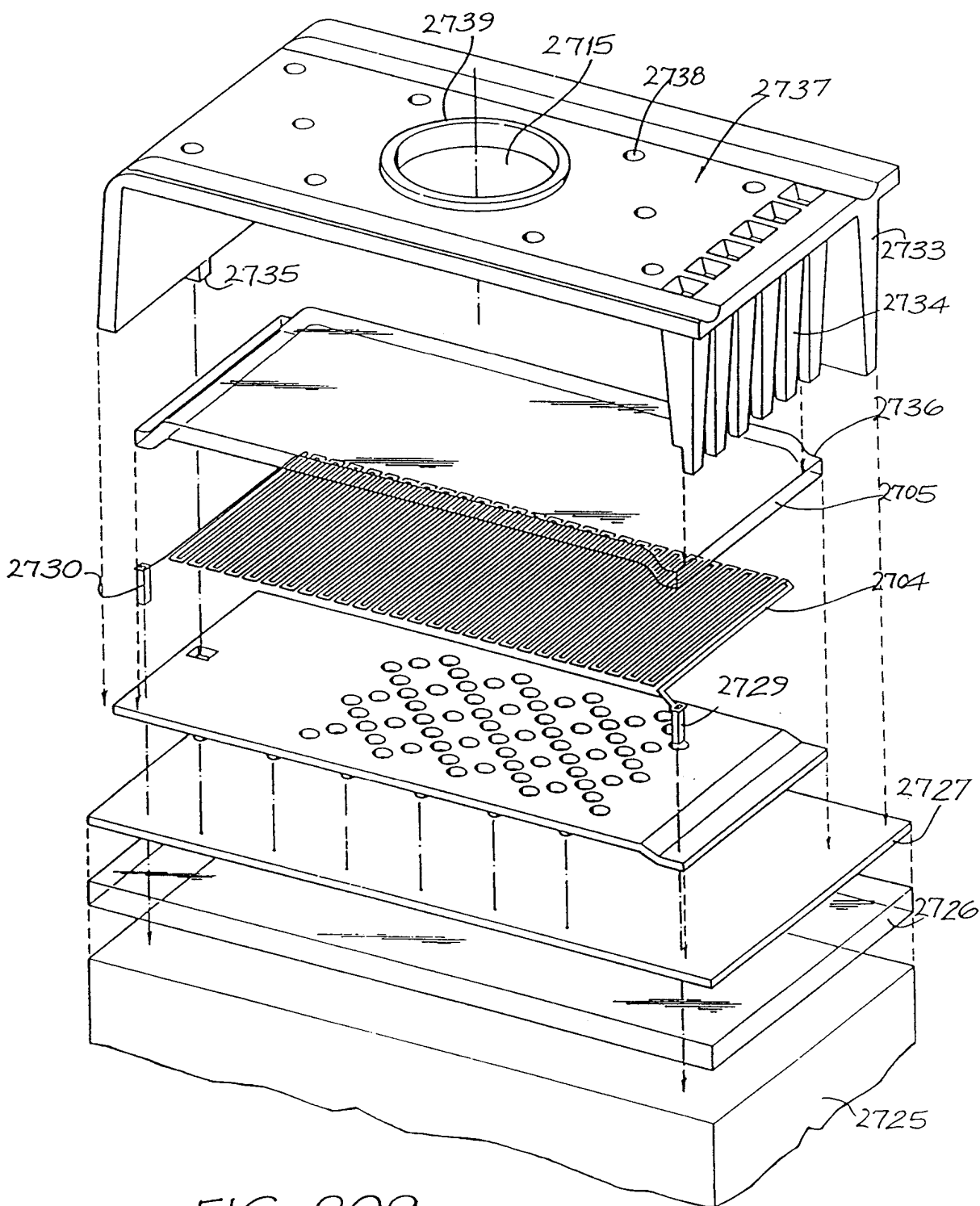
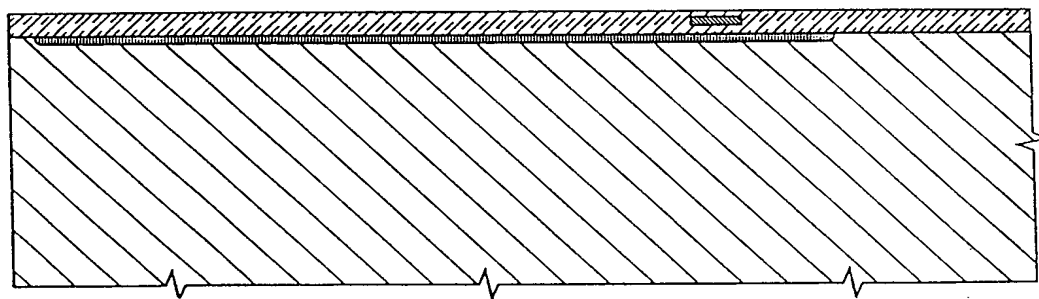
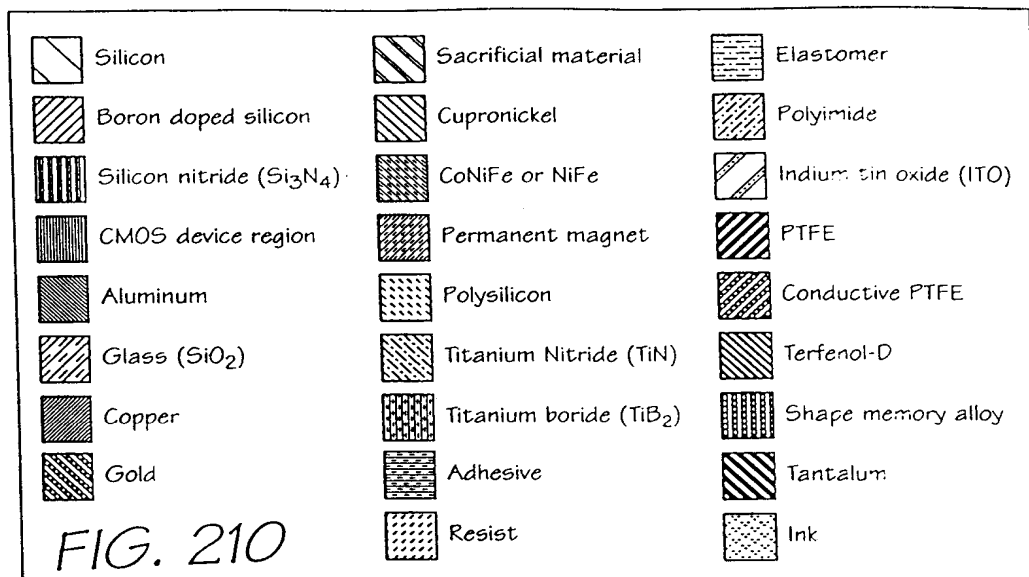
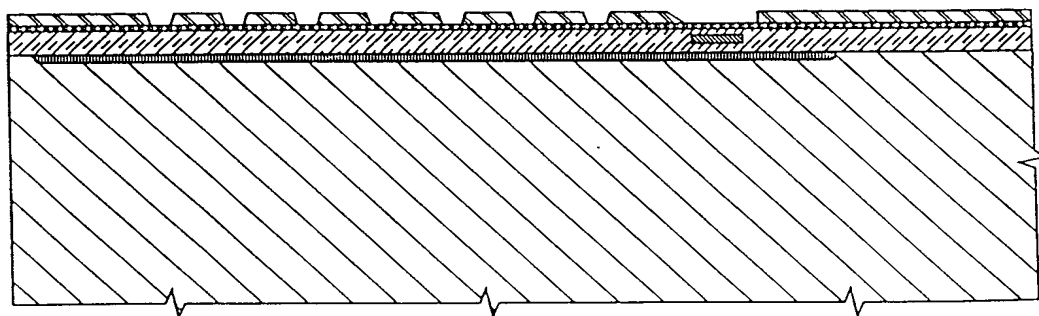


FIG. 209

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**FIG. 211****FIG. 212**

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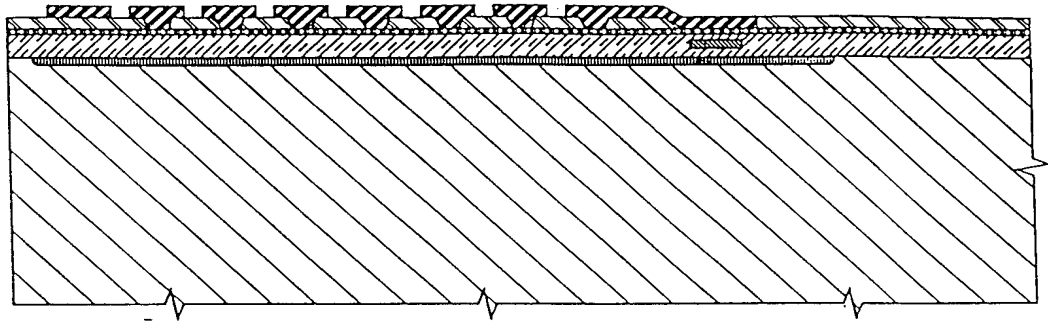


FIG. 213

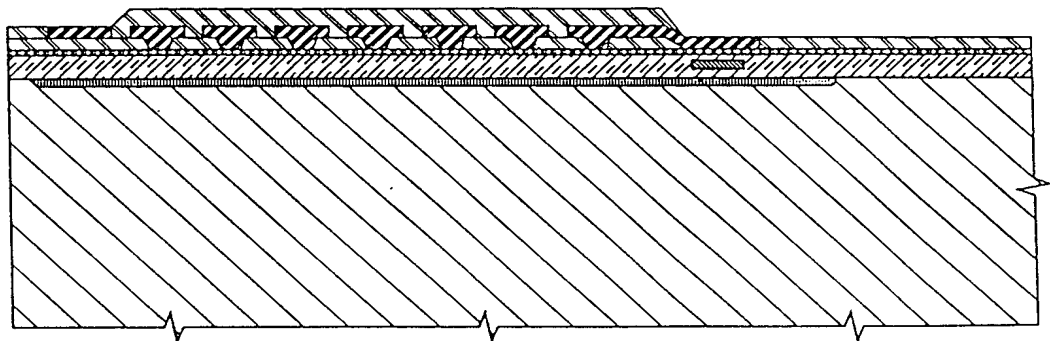


FIG. 214

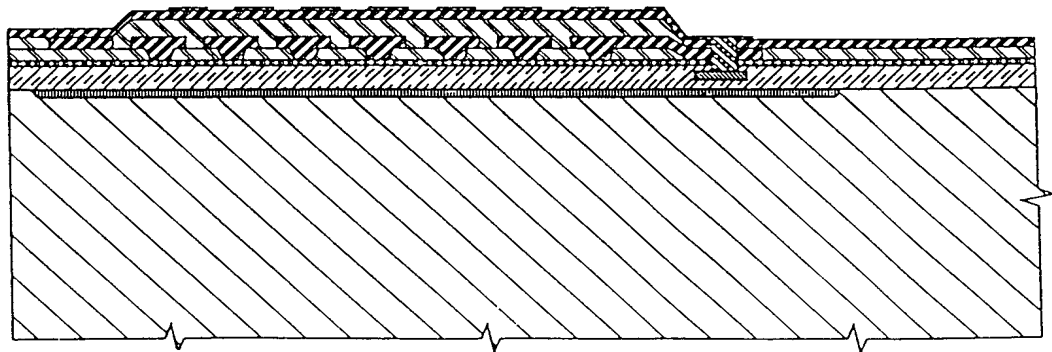


FIG. 215

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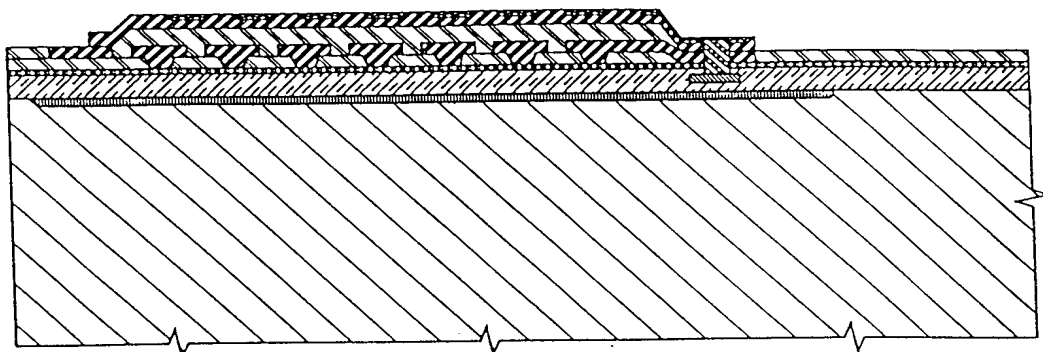


FIG. 216

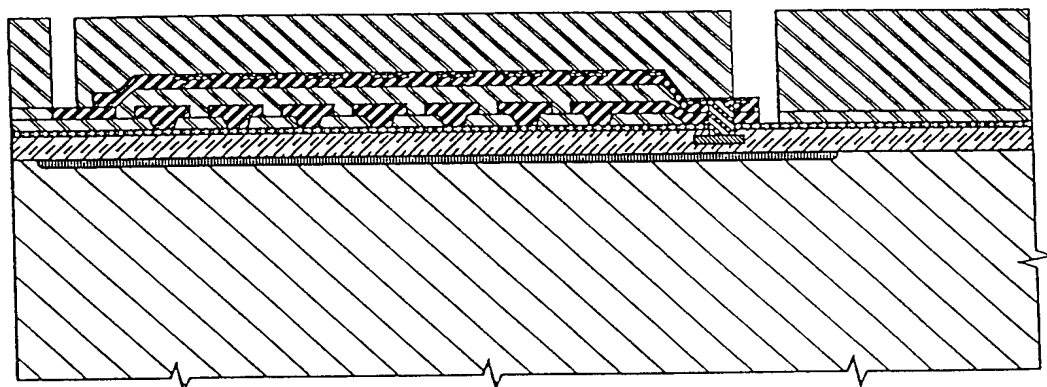


FIG. 217

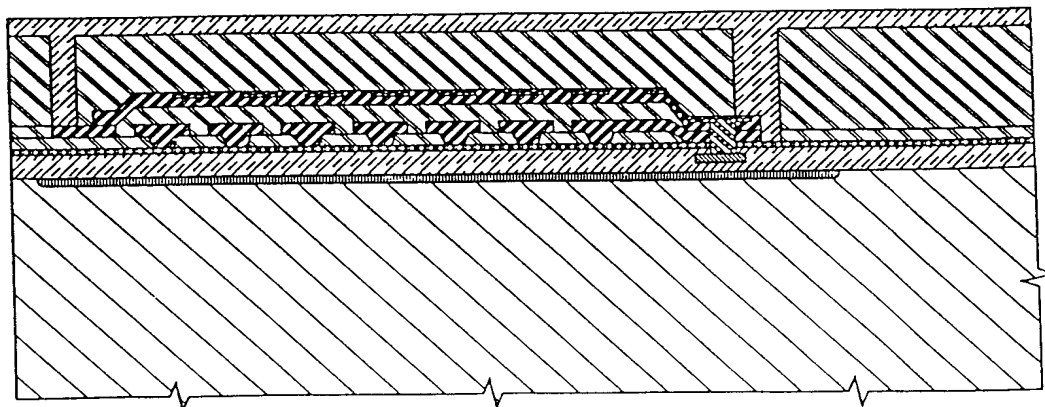


FIG. 218

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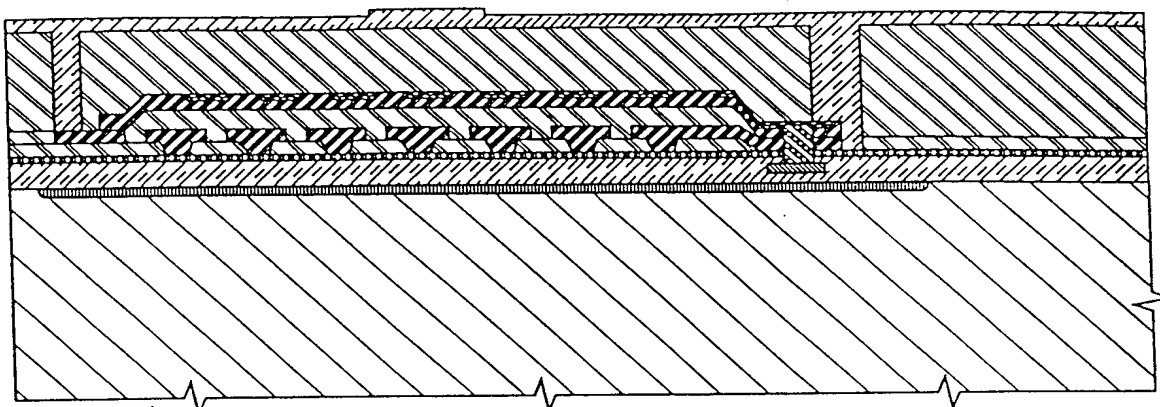


FIG. 219

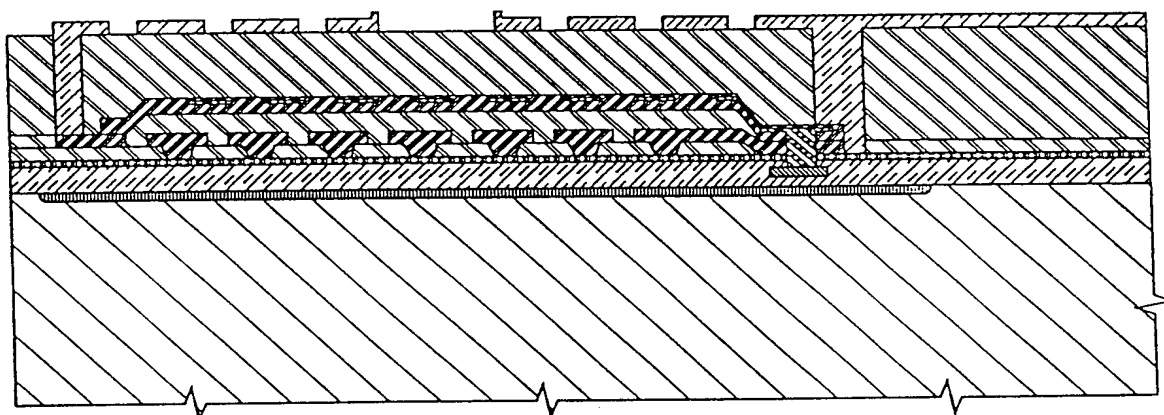


FIG. 220

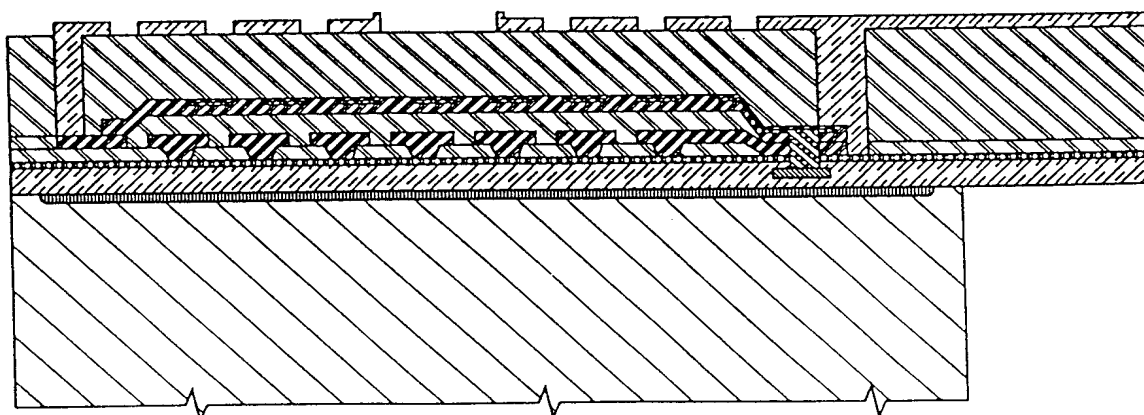


FIG. 221

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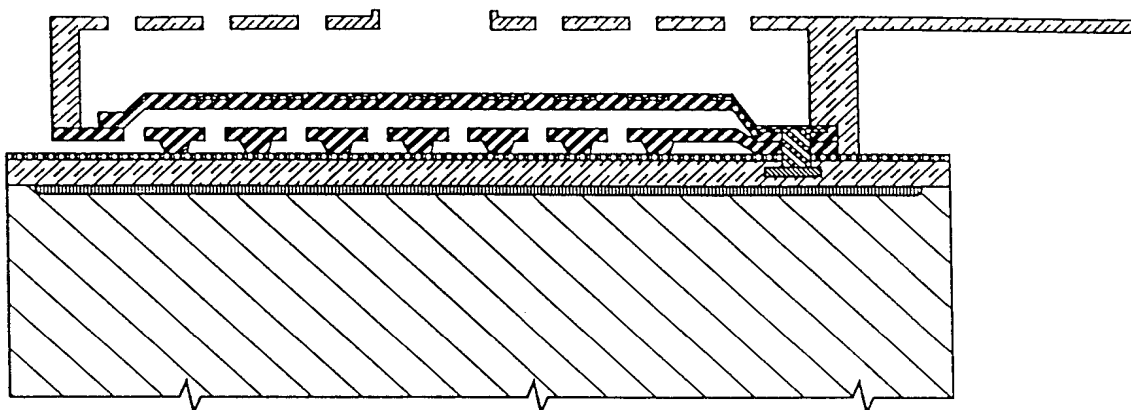


FIG. 222

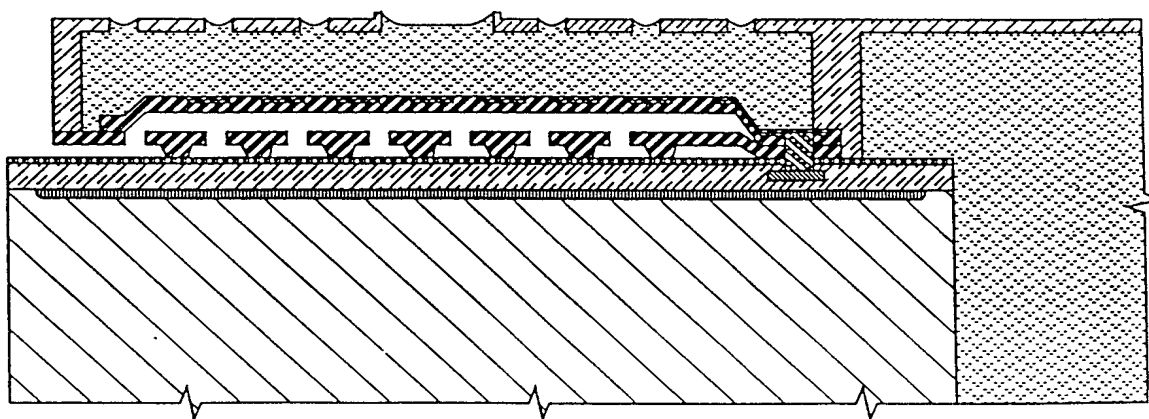


FIG. 223

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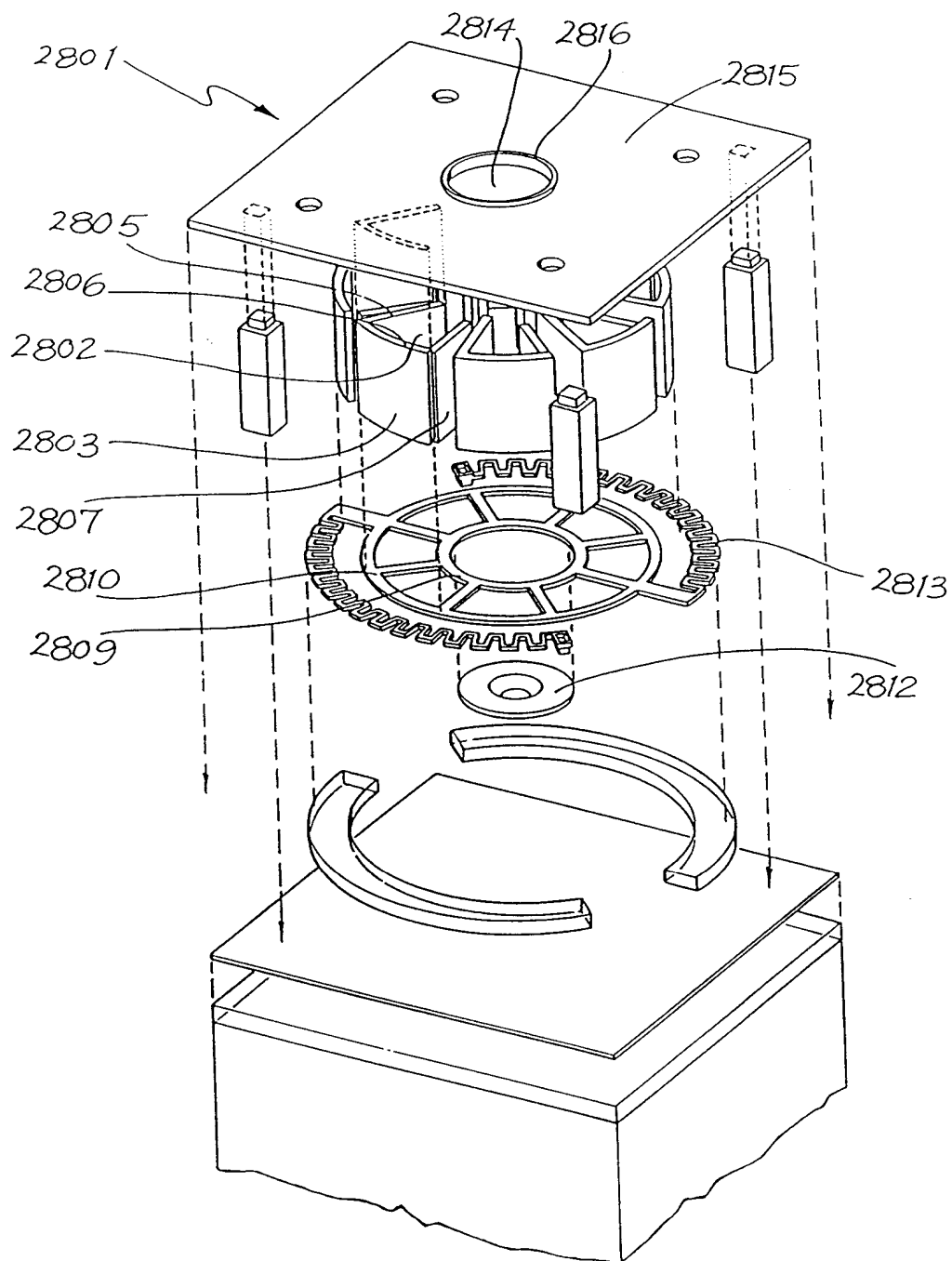


FIG. 224

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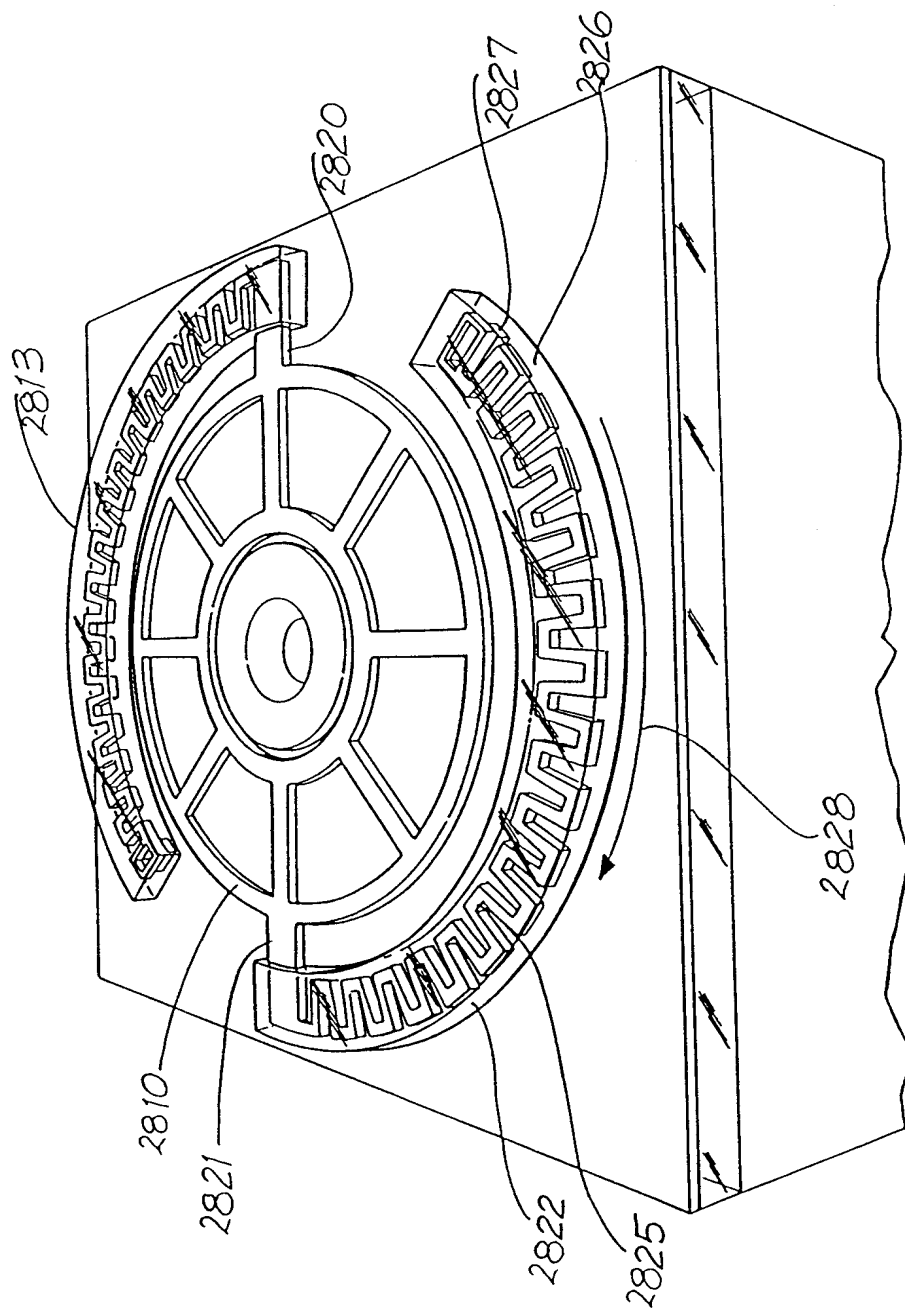
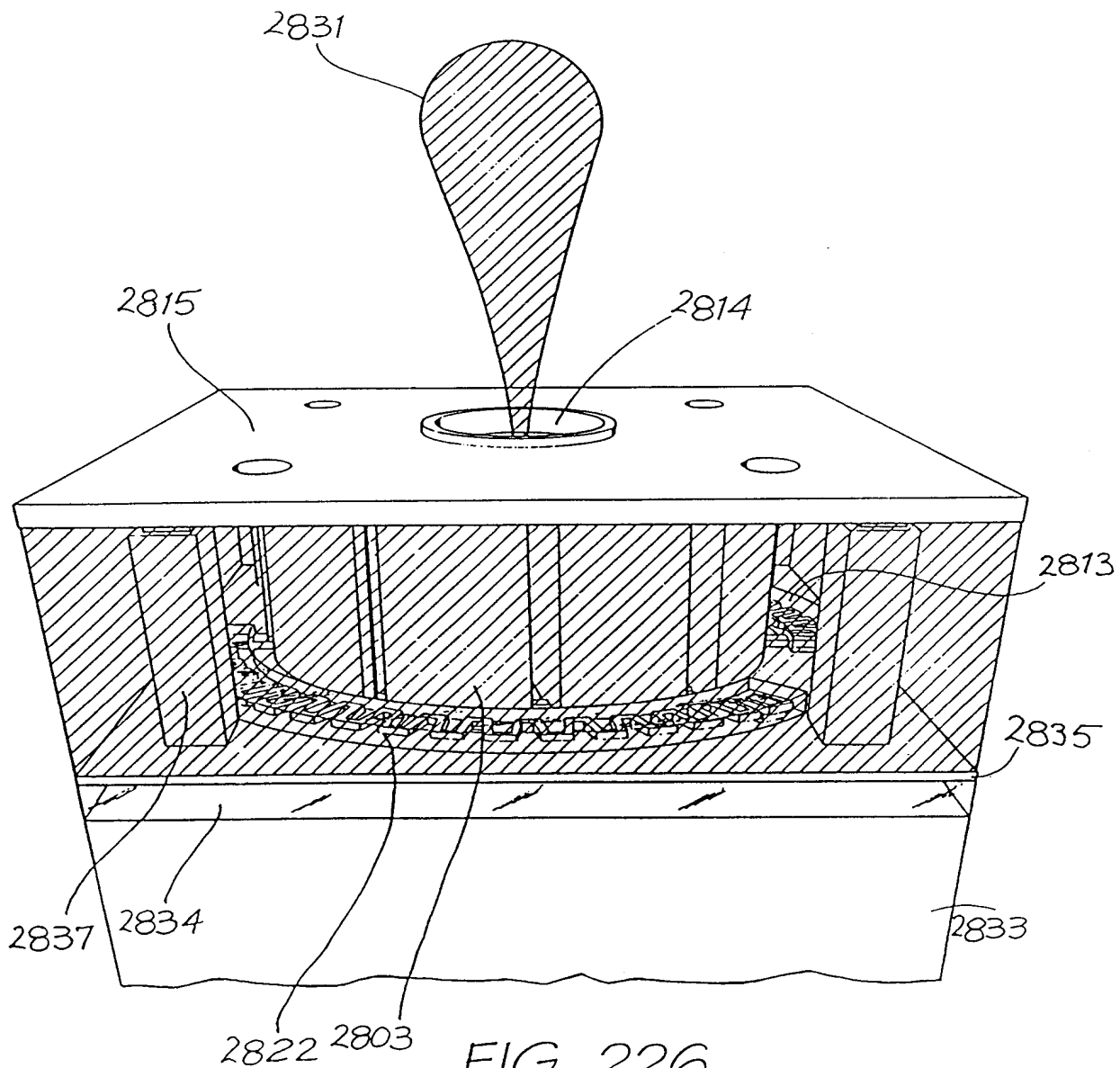
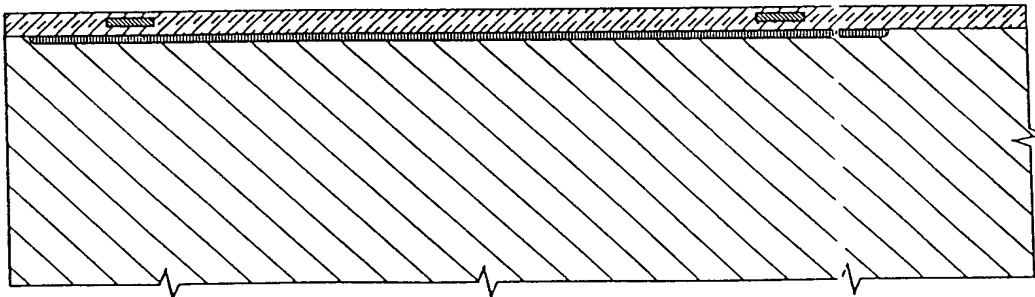
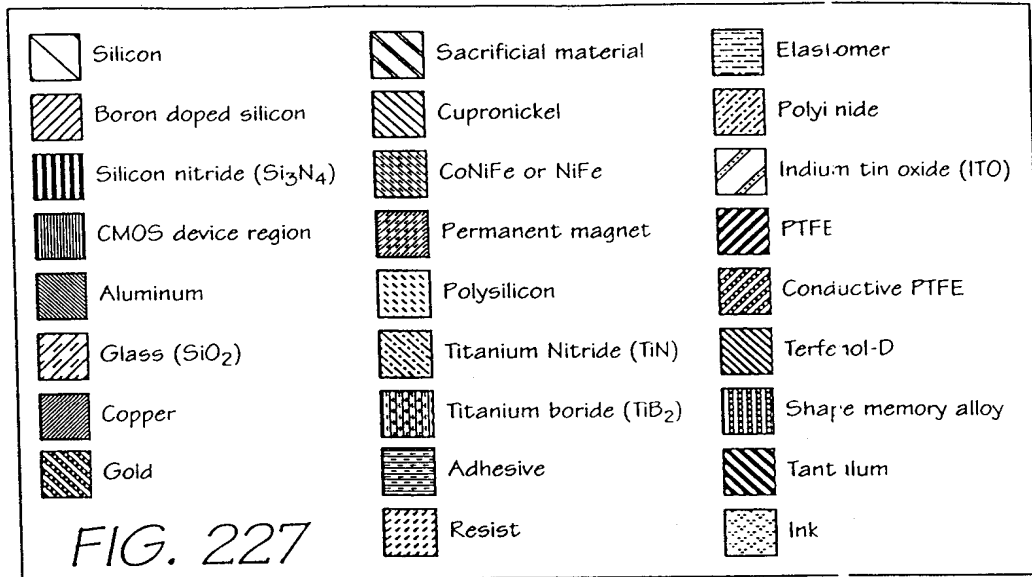
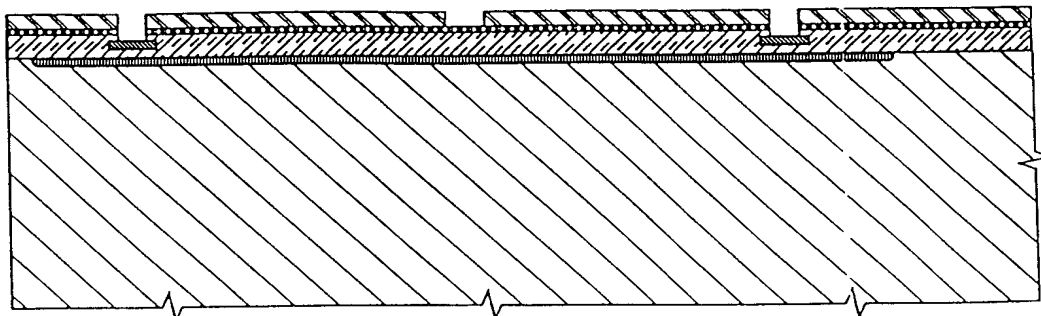


FIG. 225

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*FIG. 228**FIG. 229*

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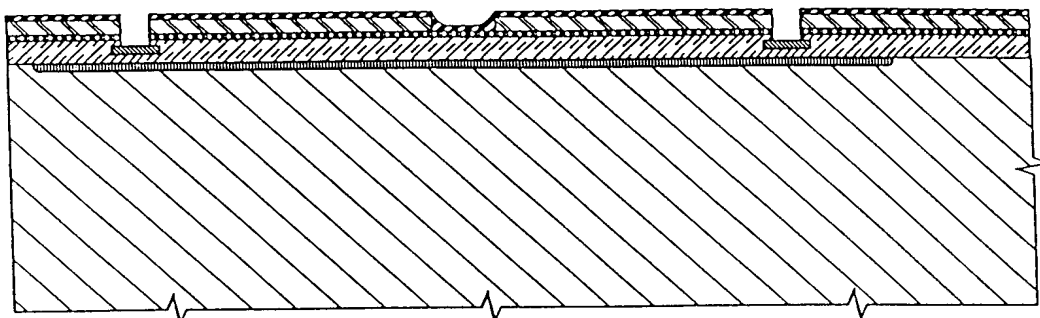


FIG. 230

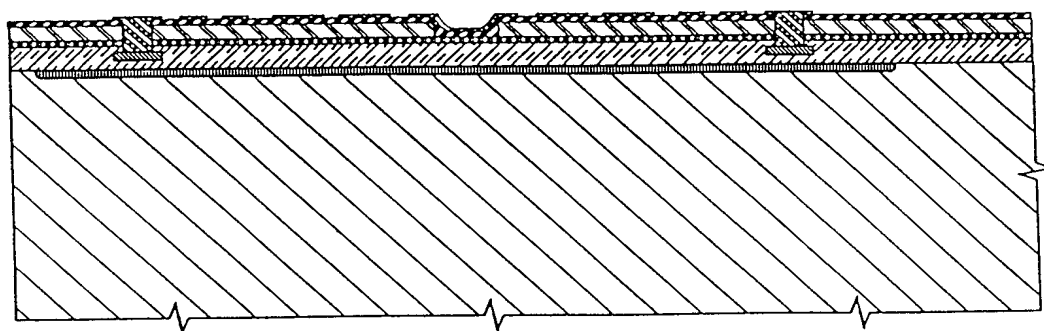


FIG. 231

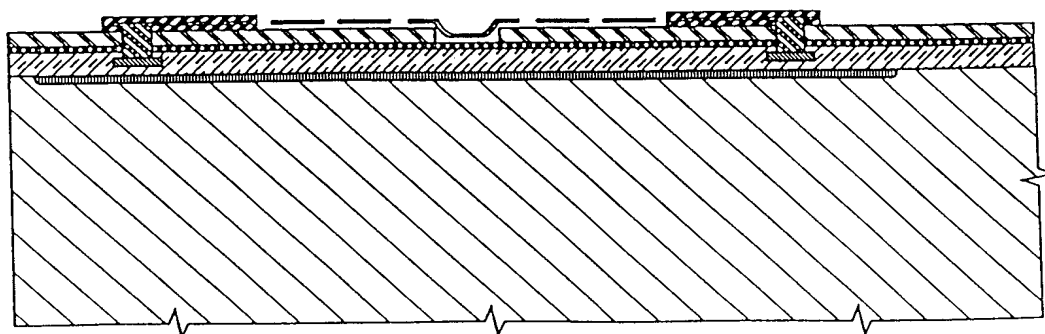


FIG. 232

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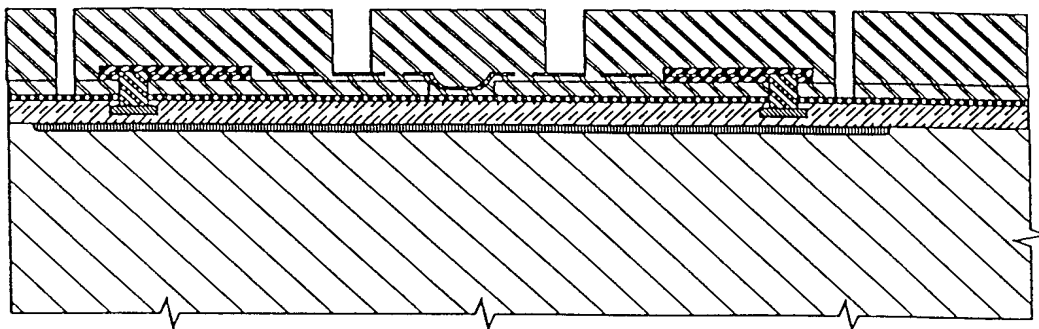


FIG. 233

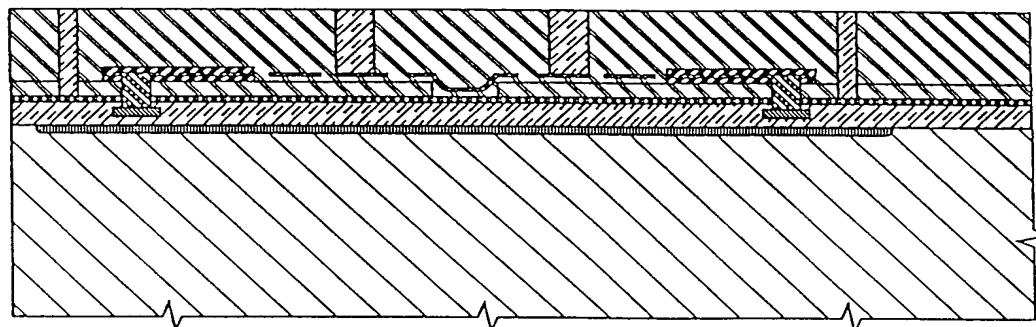


FIG. 234

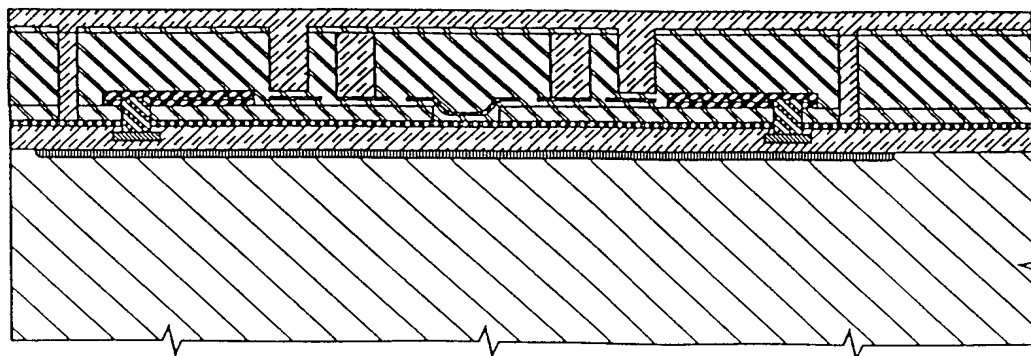


FIG. 235

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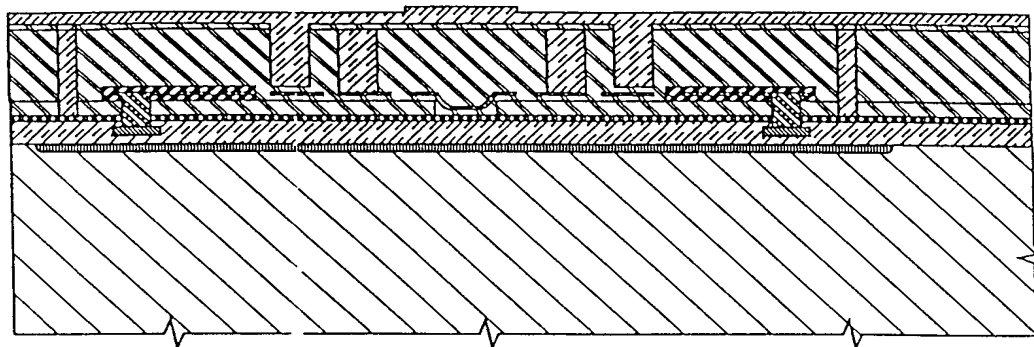


FIG. 236

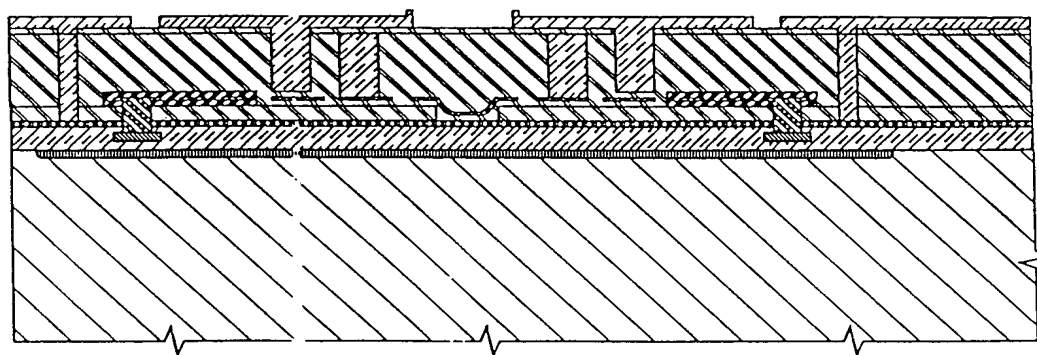


FIG. 237

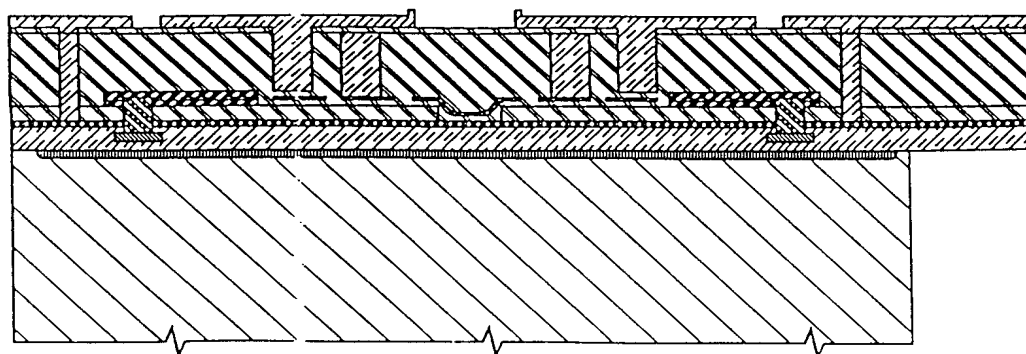


FIG. 238

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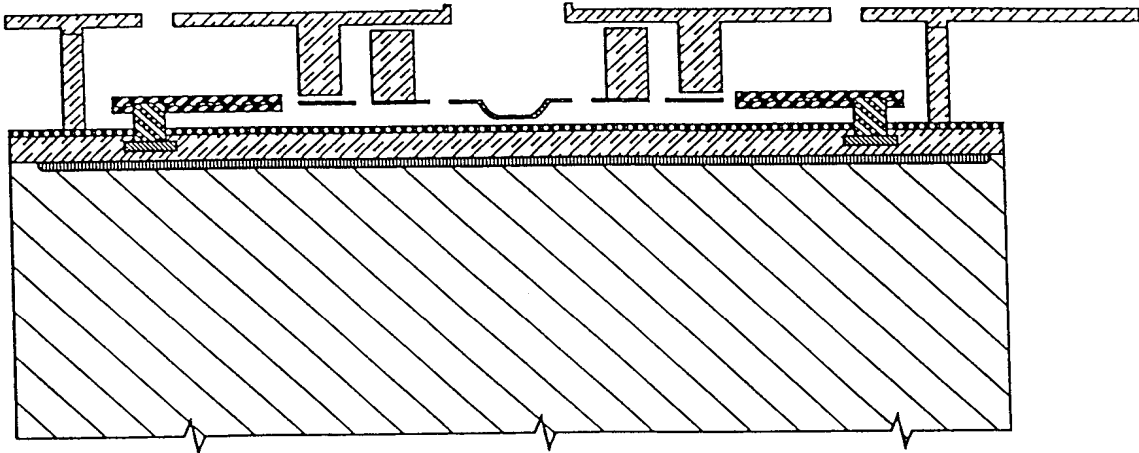


FIG. 239

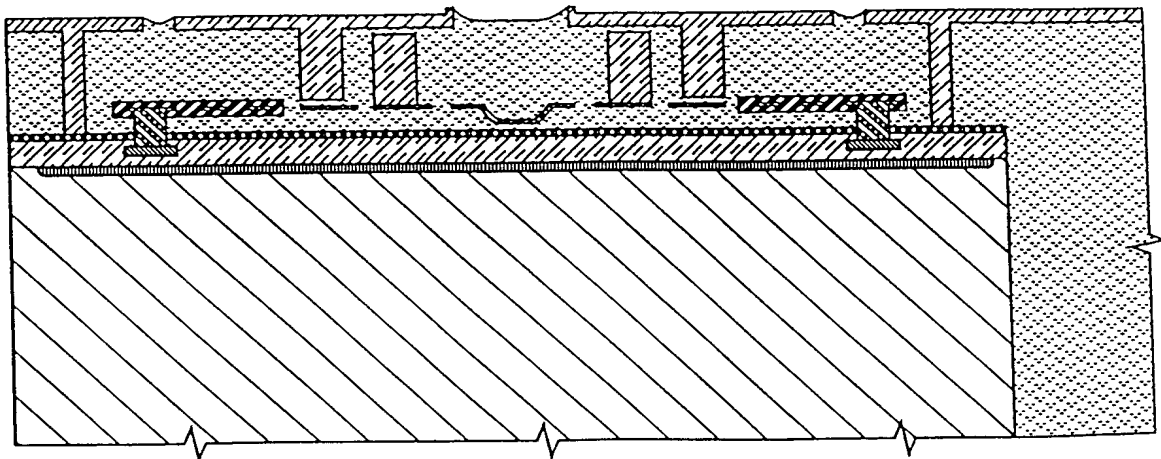


FIG. 240

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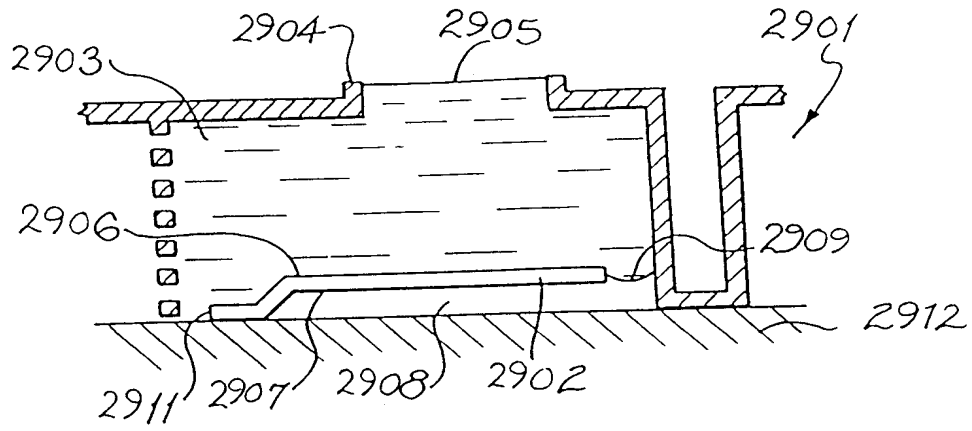


FIG. 241

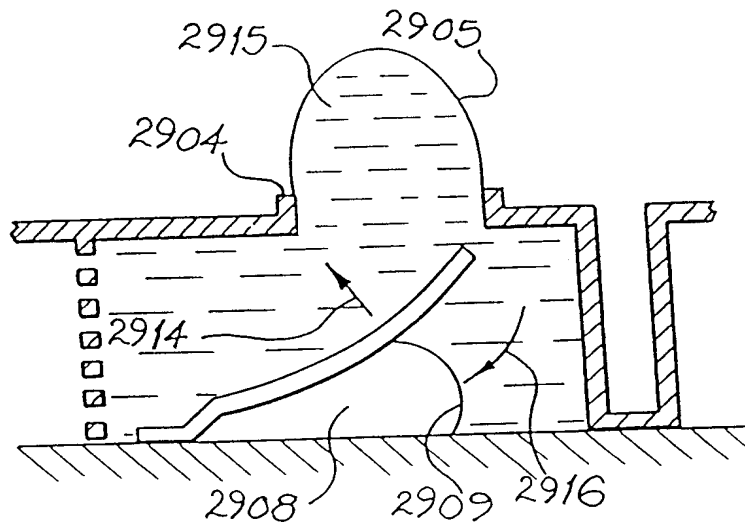


FIG. 242

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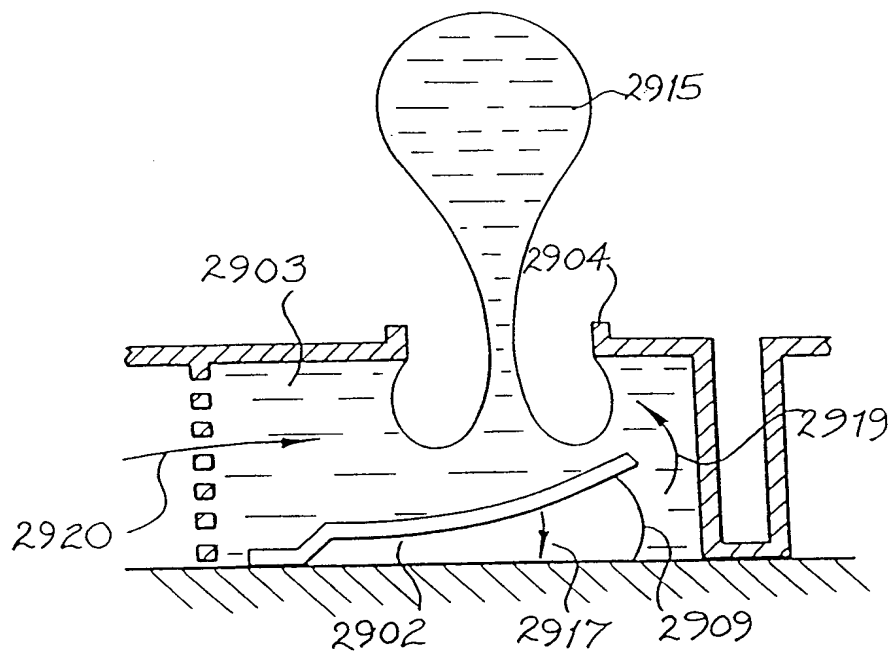


FIG. 243

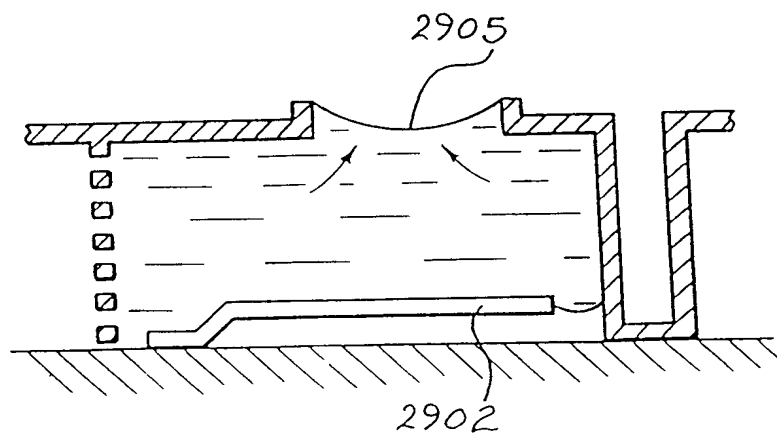


FIG. 244

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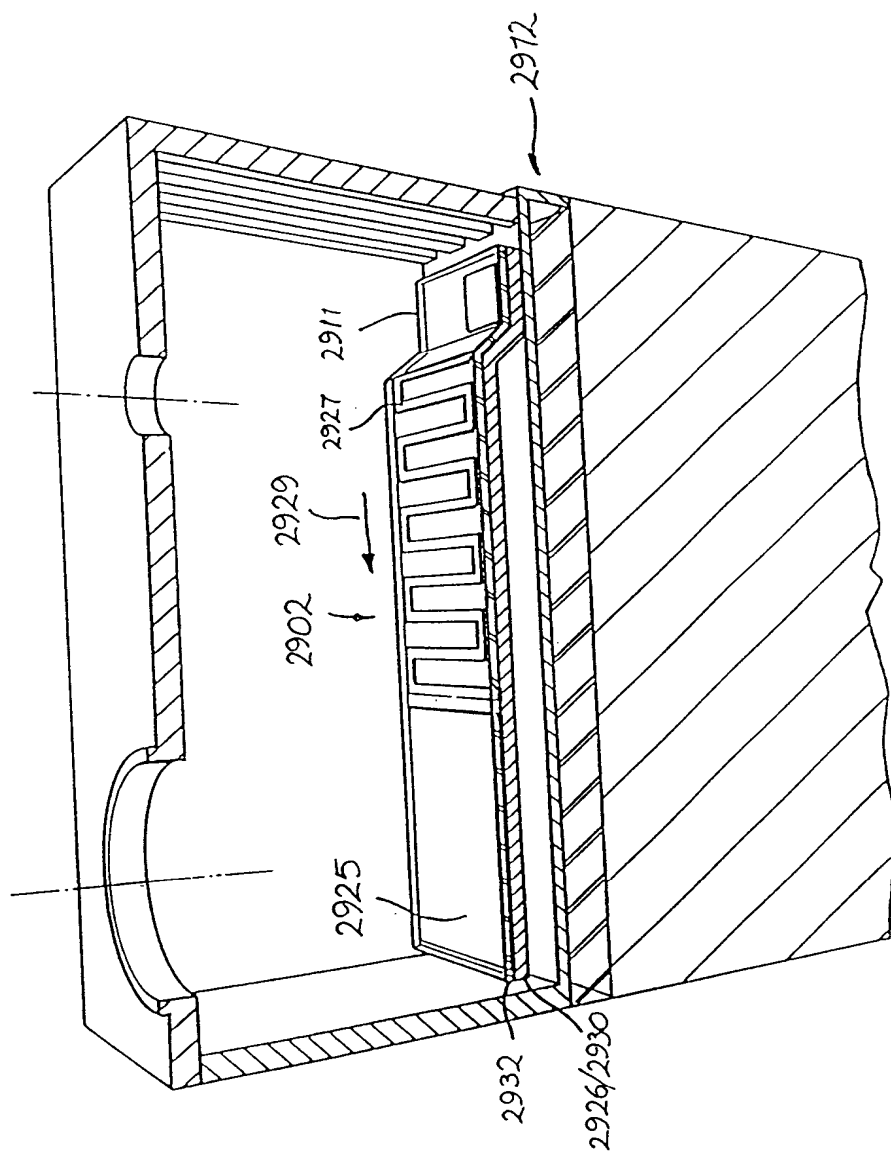


FIG. 245

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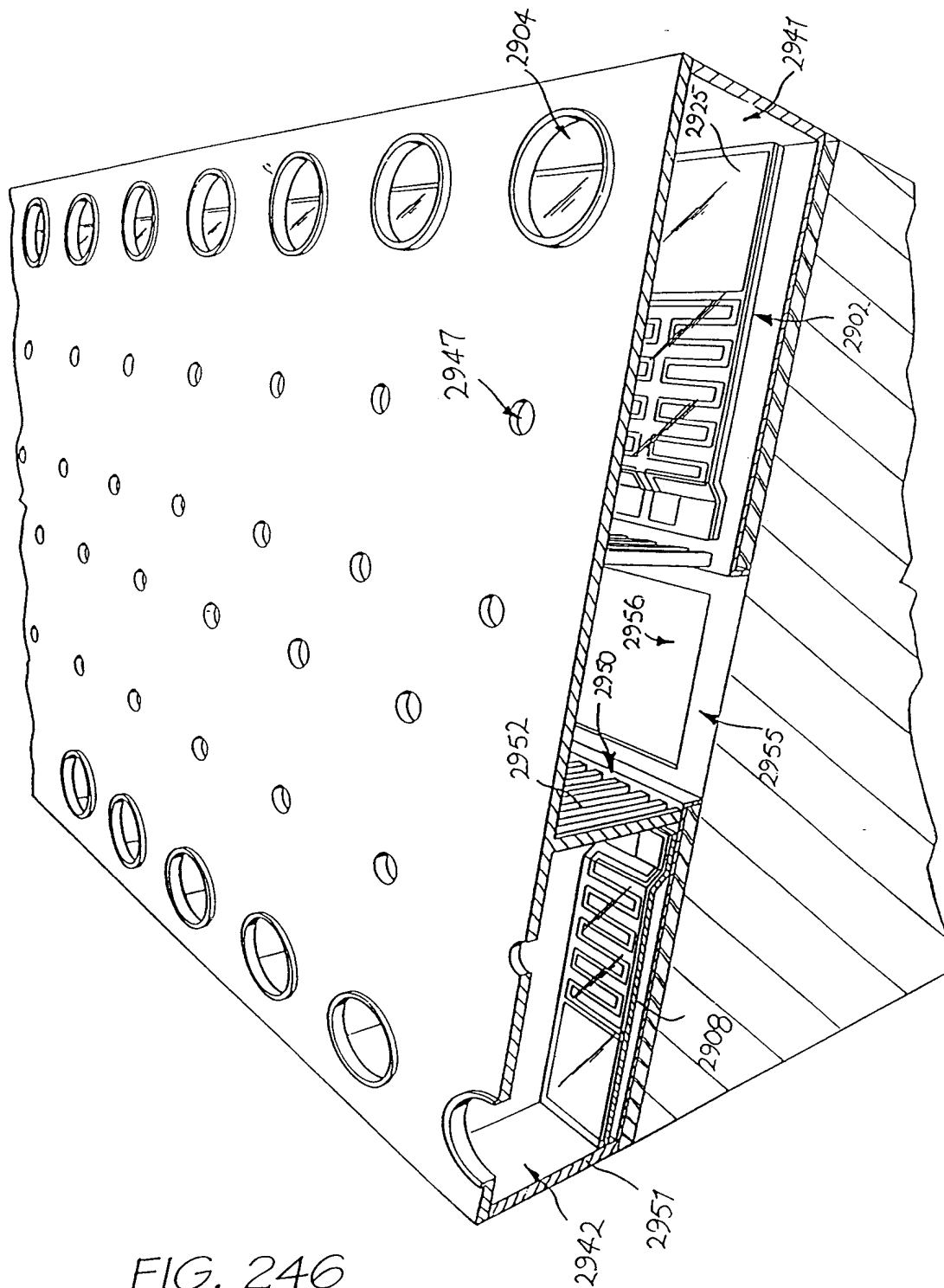


FIG. 246

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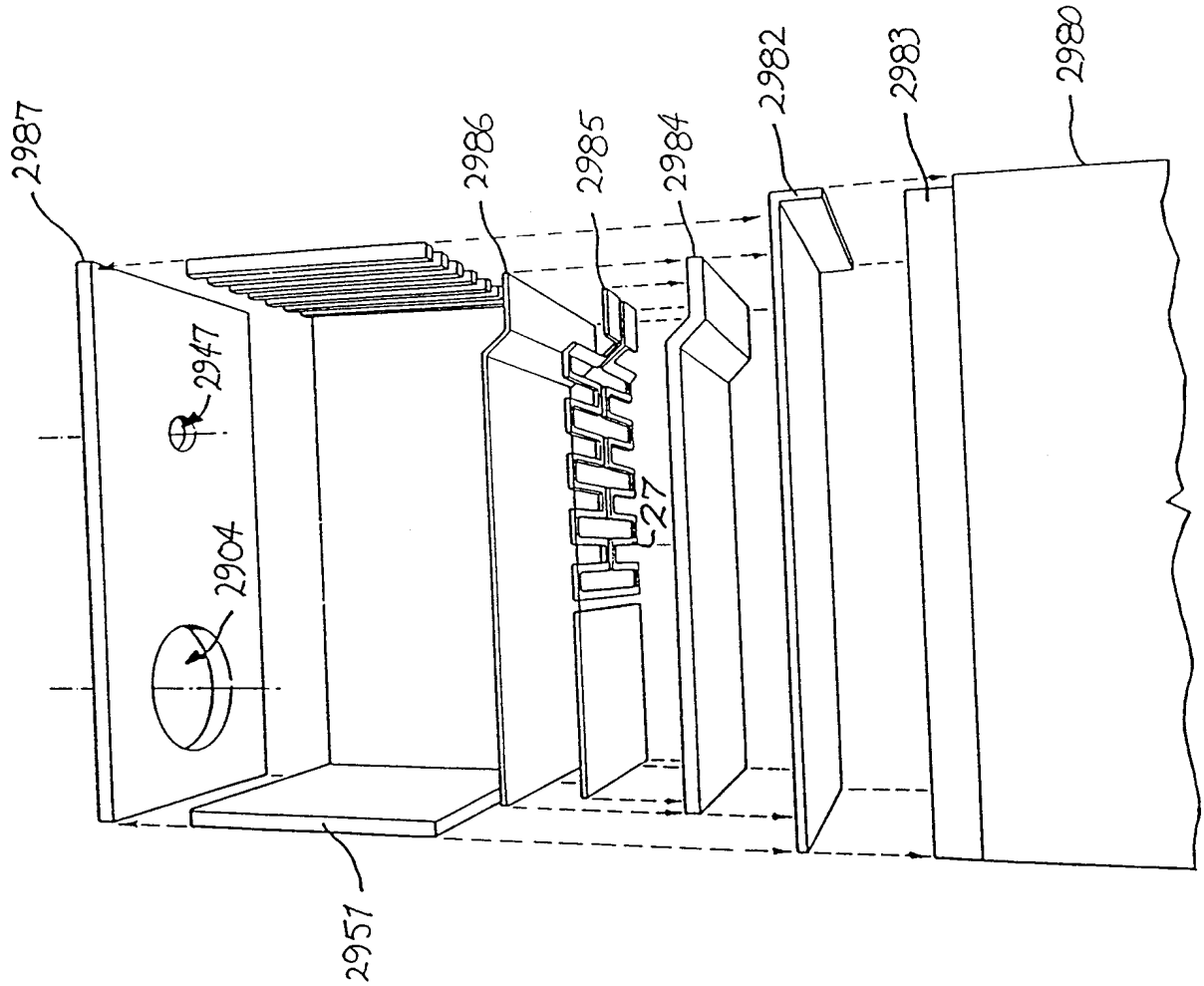


FIG. 247

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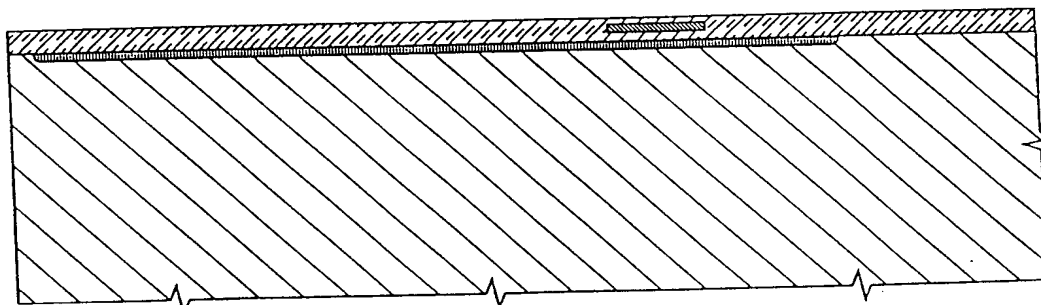
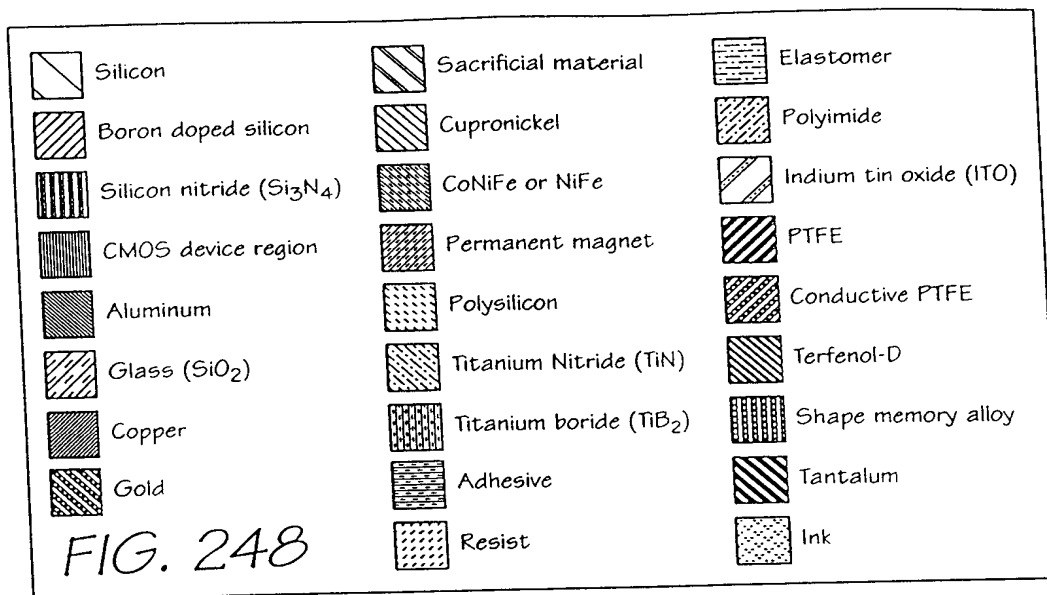


FIG. 249

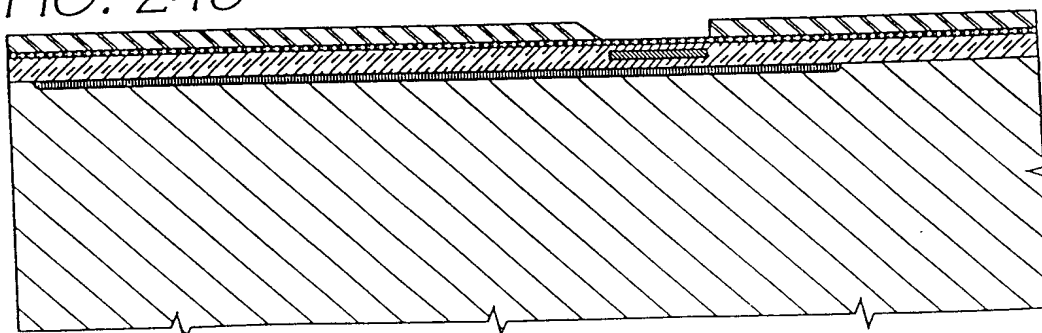


FIG. 250

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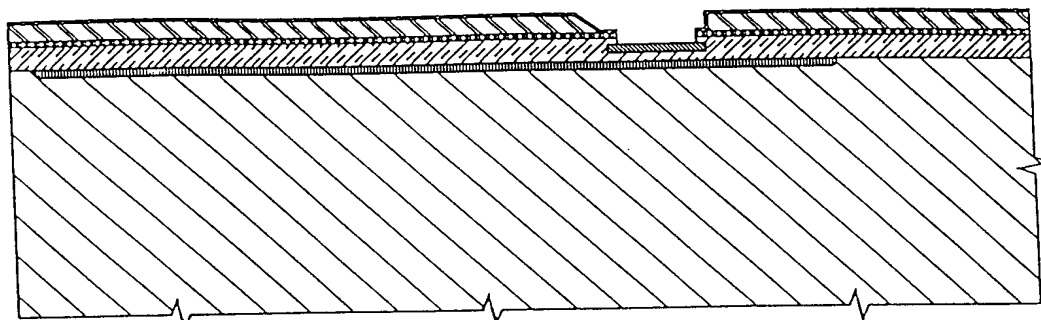


FIG. 251

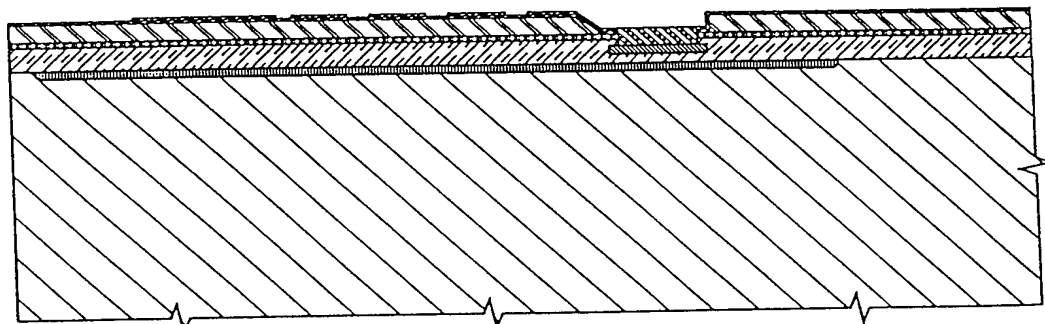


FIG. 252

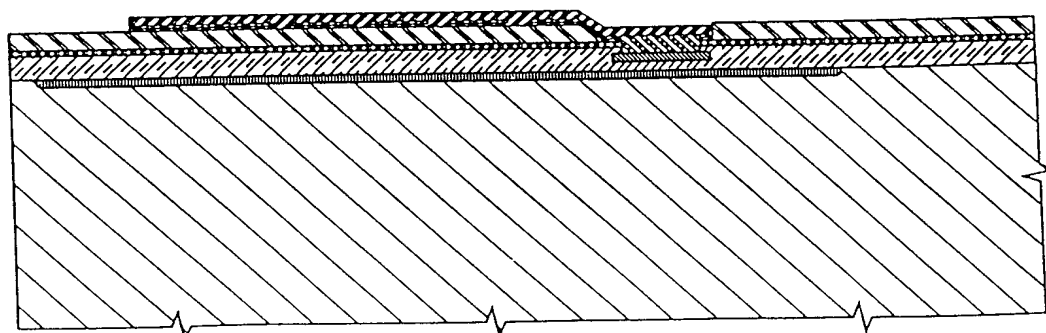


FIG. 253

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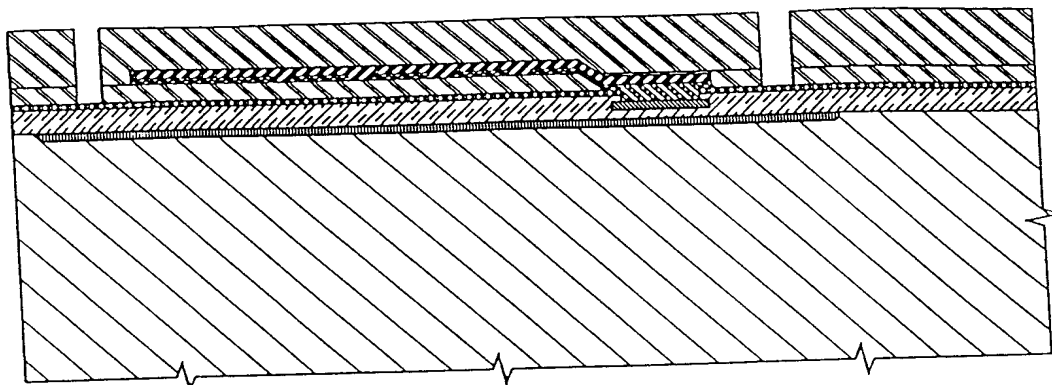


FIG. 254

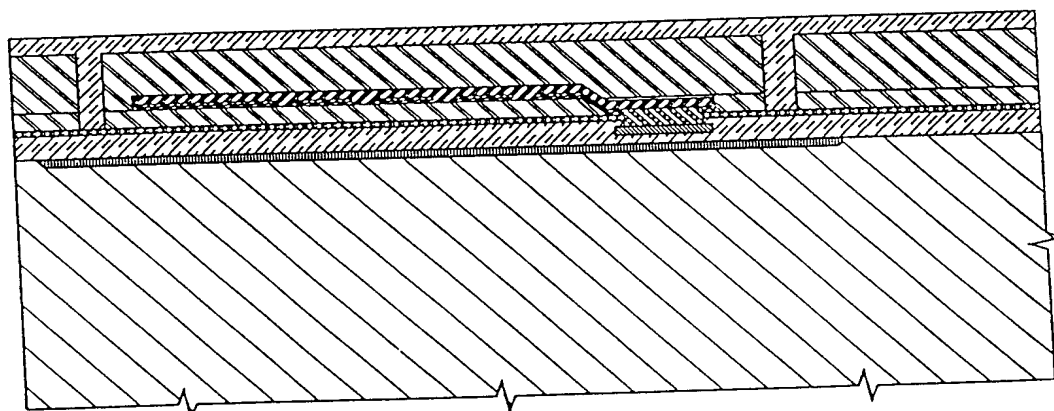


FIG. 255

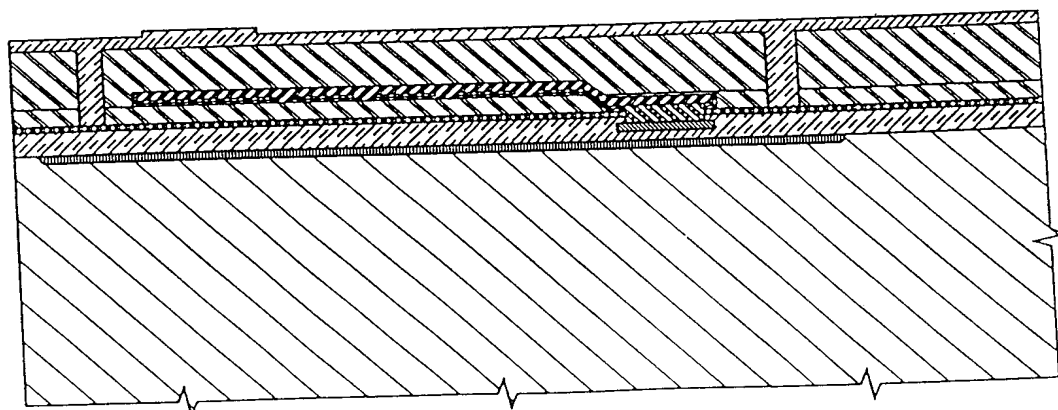


FIG. 256

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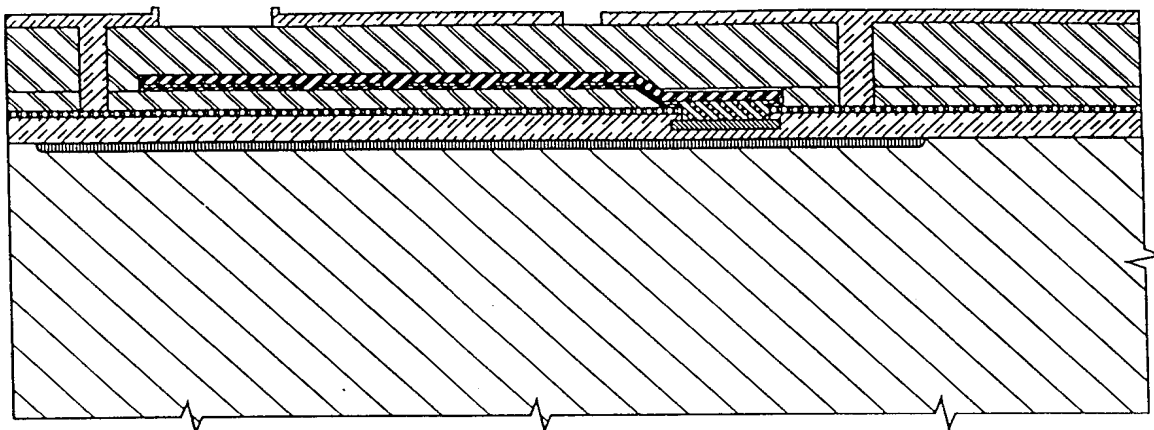


FIG. 257

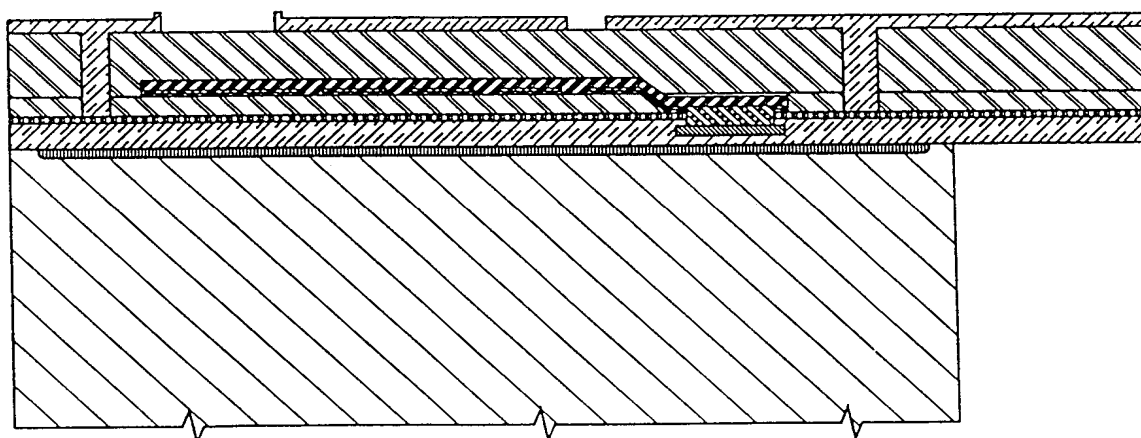


FIG. 258

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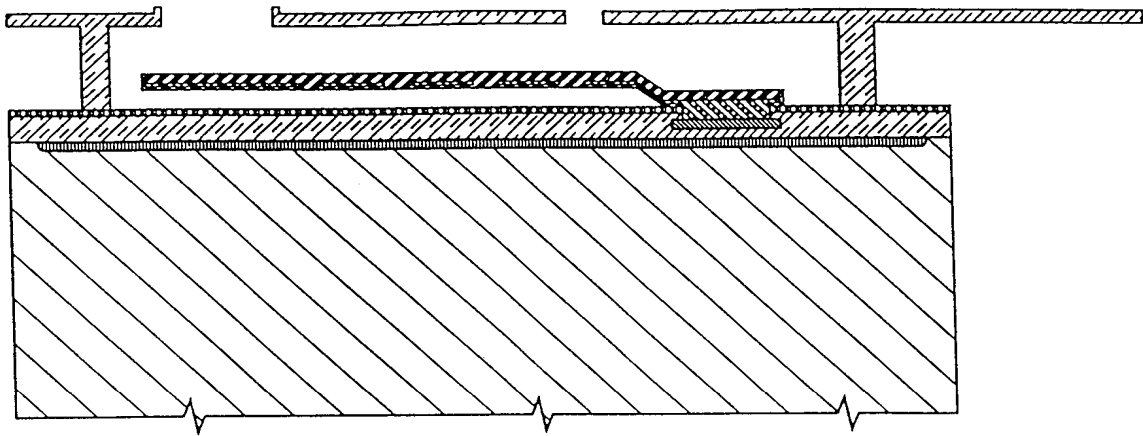


FIG. 259

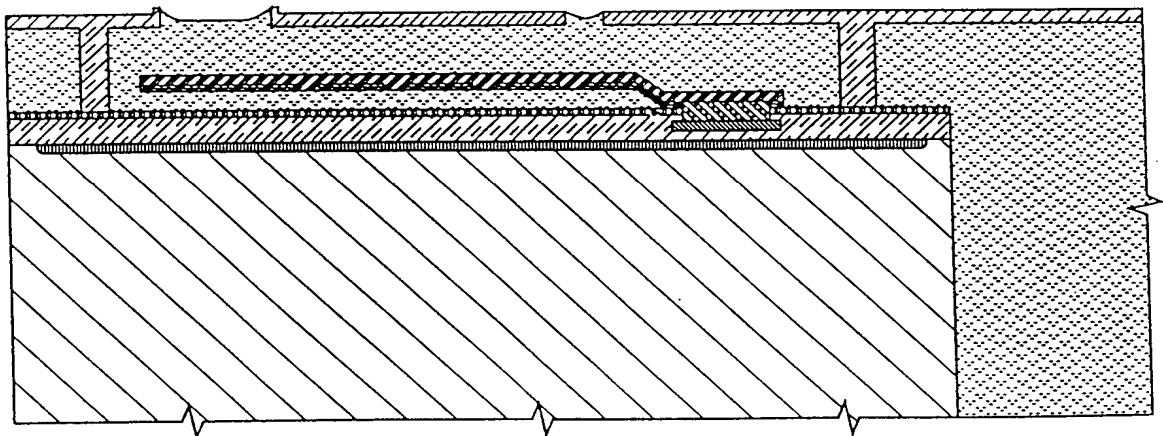
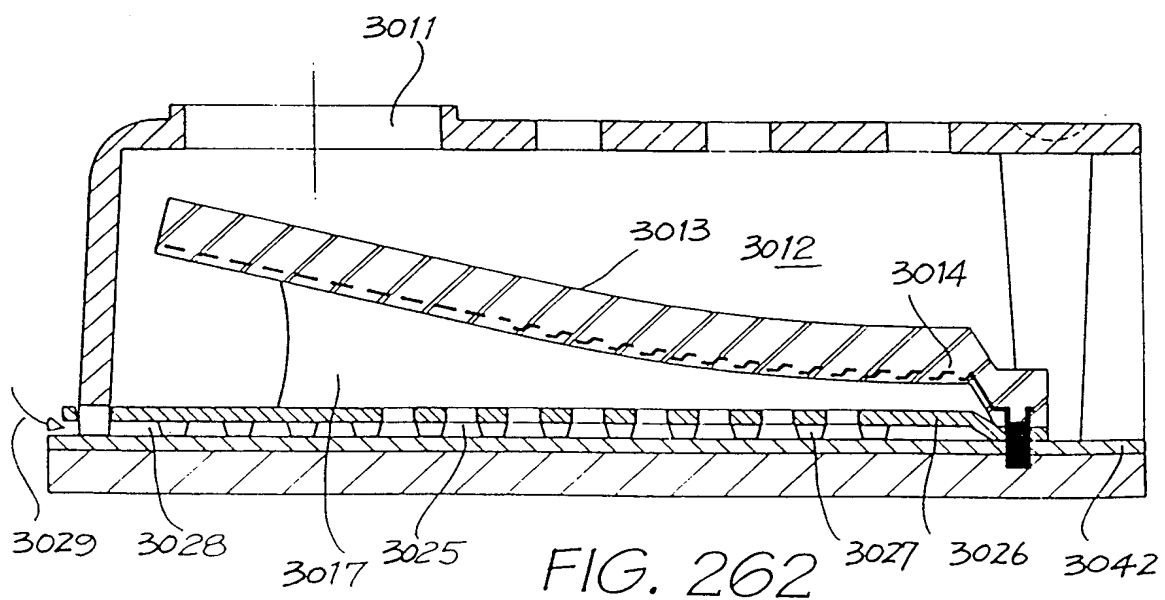
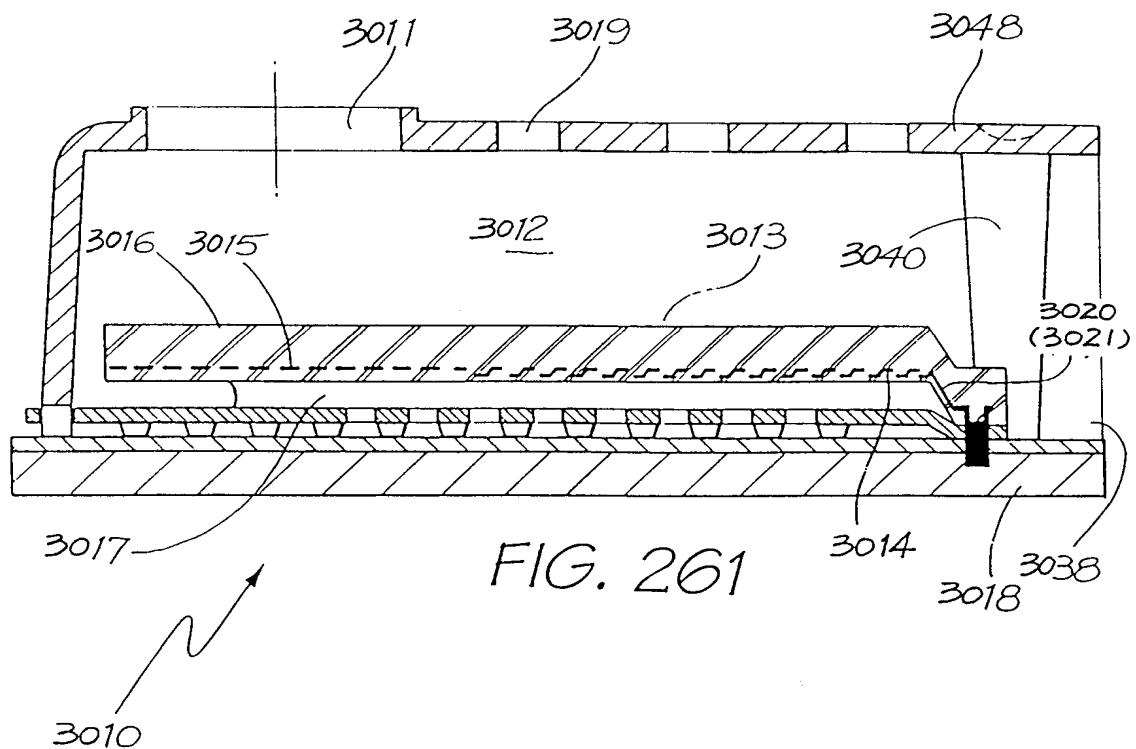
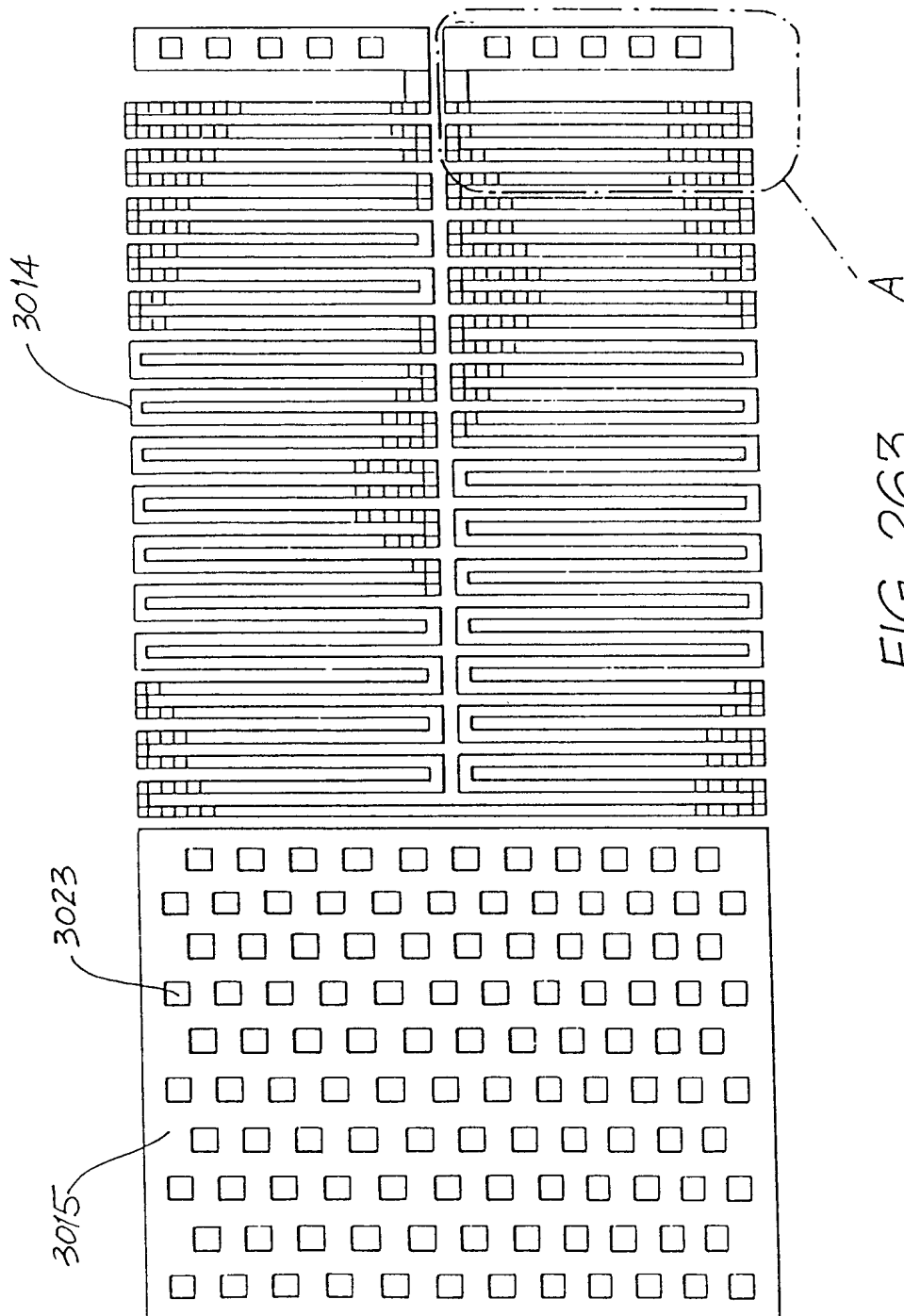


FIG. 260

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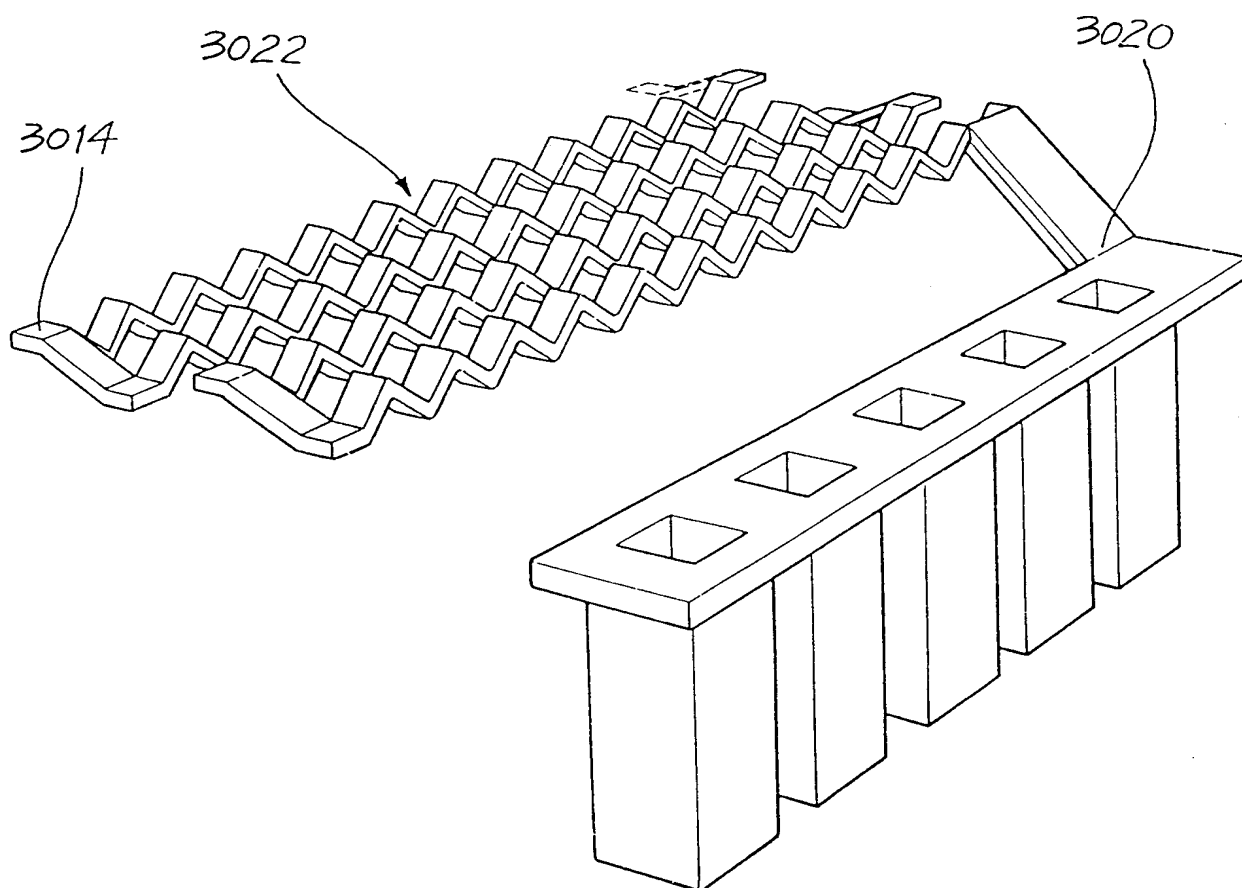


FIG. 264

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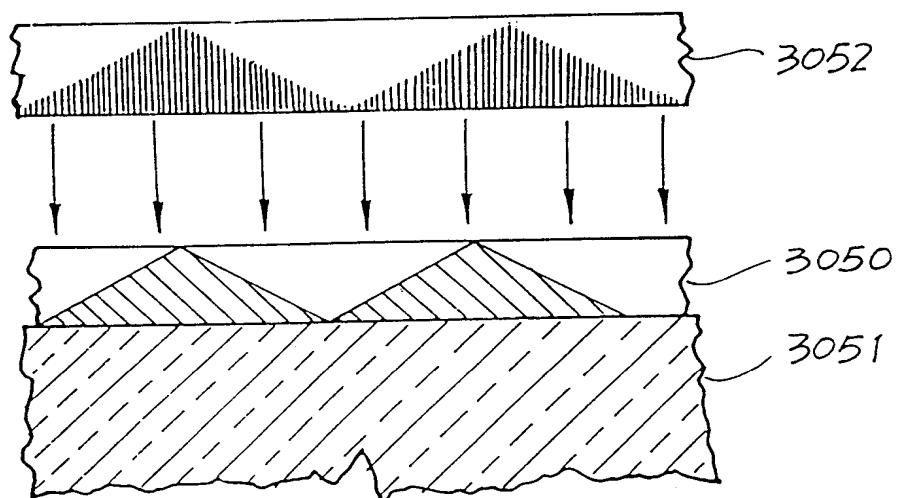


FIG. 265

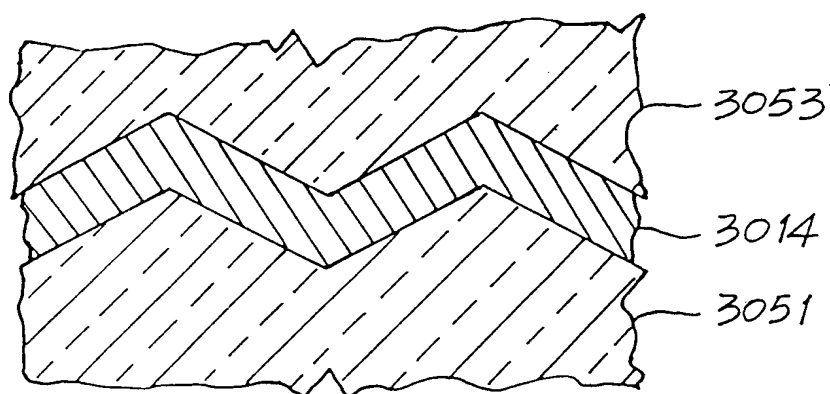


FIG. 266

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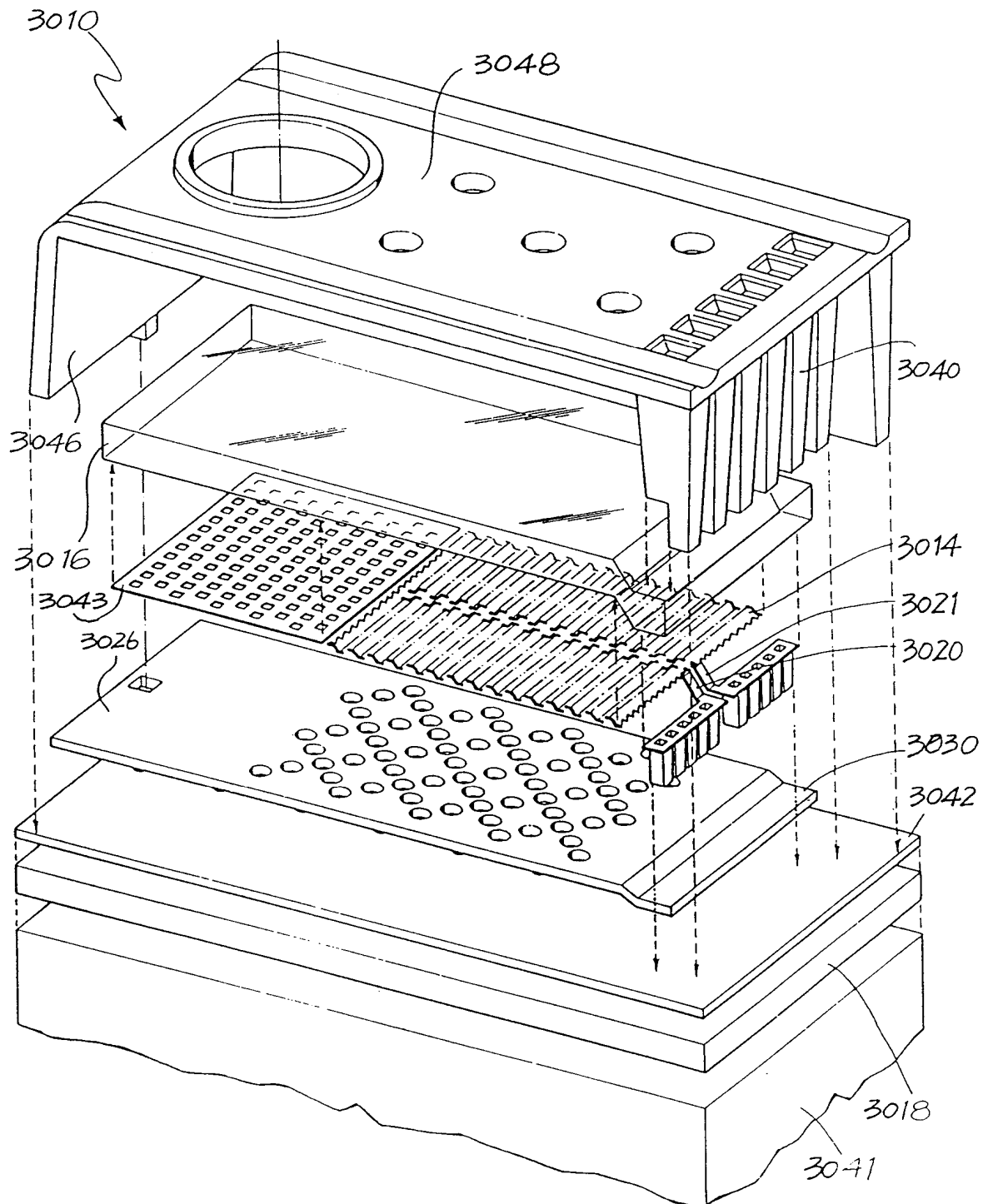


FIG. 267

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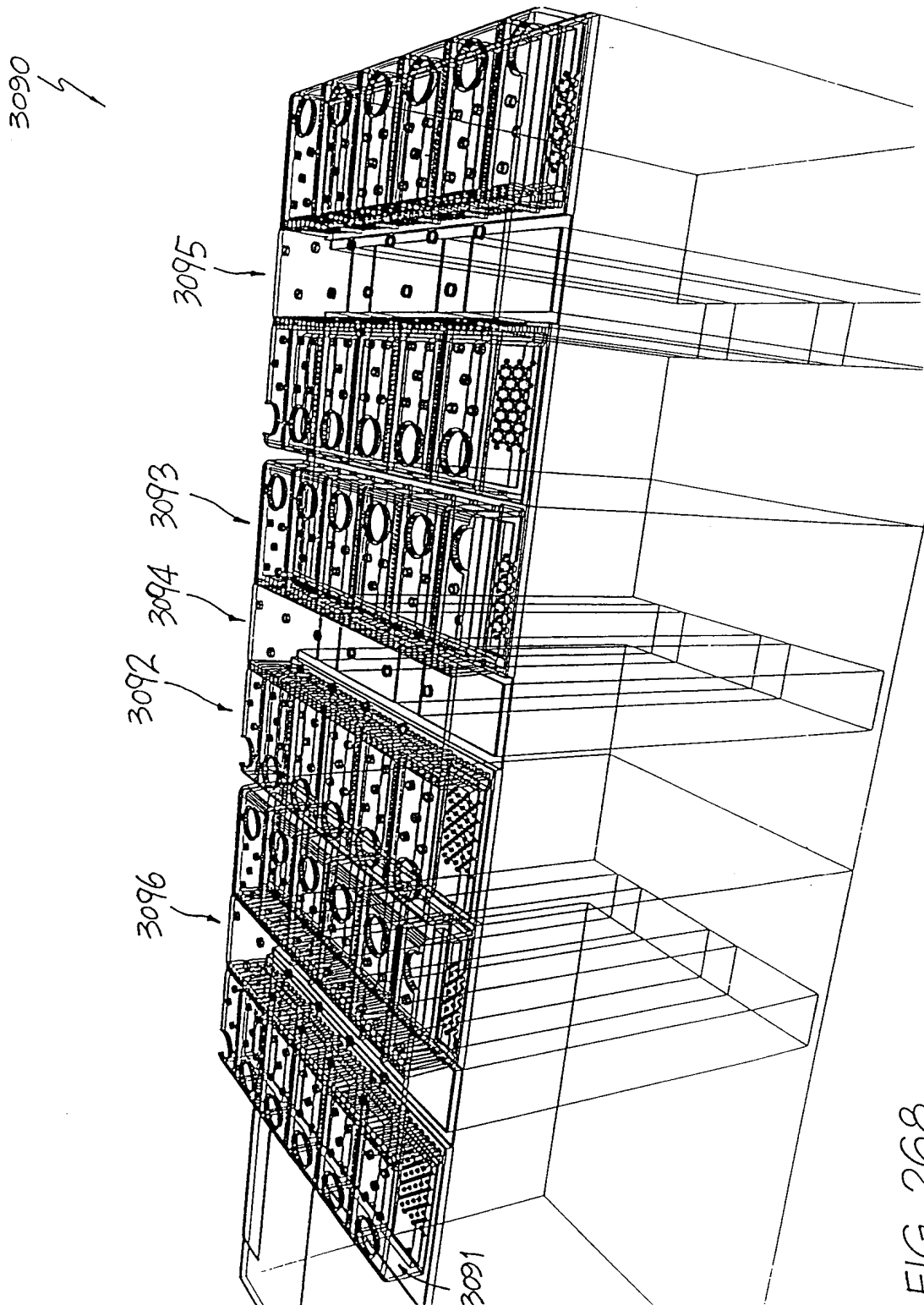
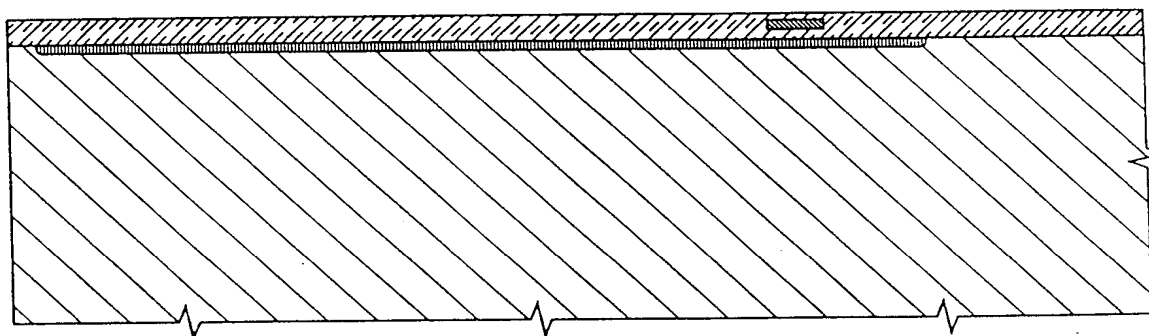
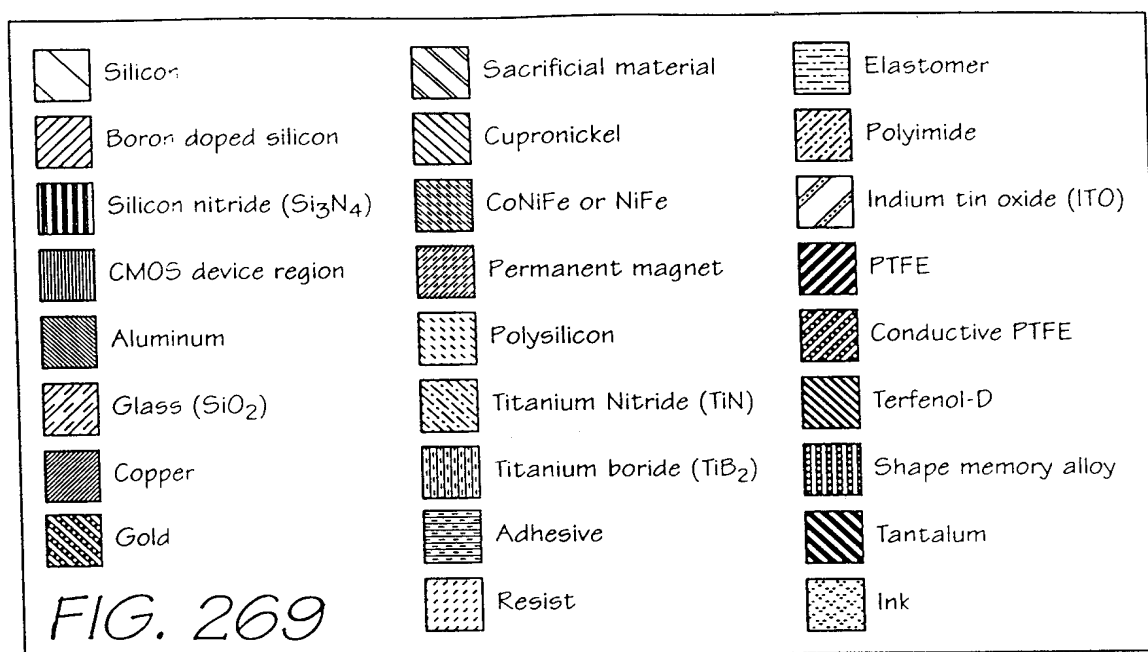
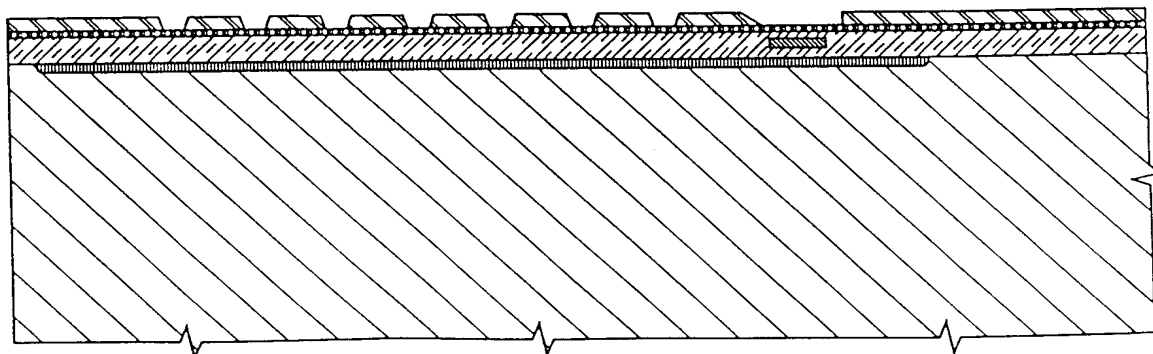


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*FIG. 270**FIG. 271*

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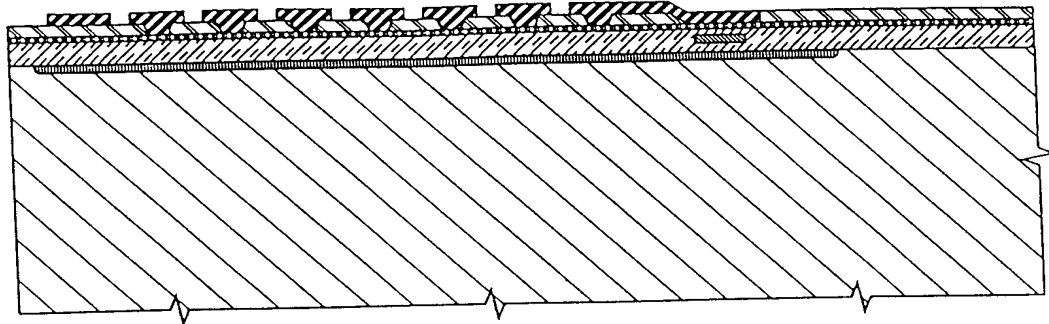


FIG. 272

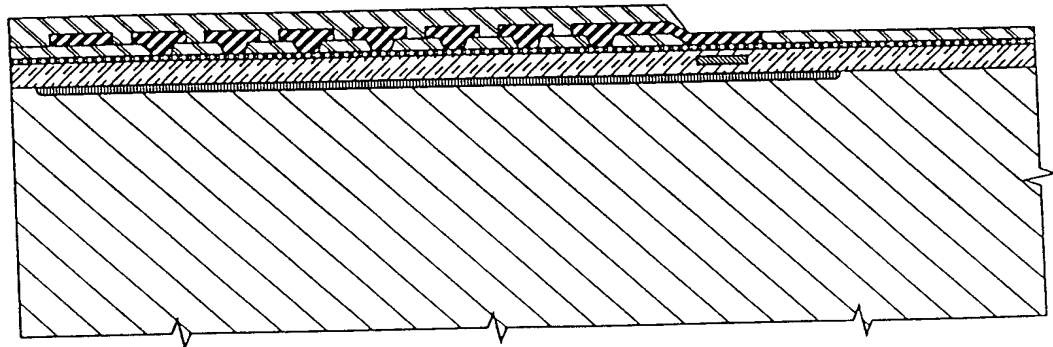


FIG. 273

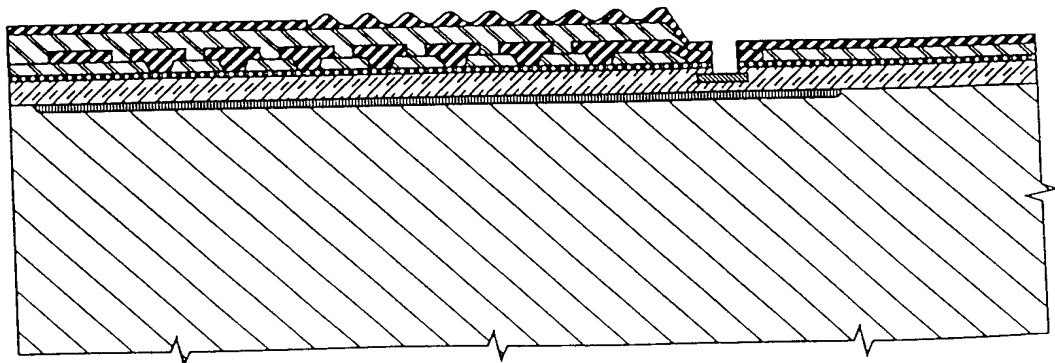


FIG. 274

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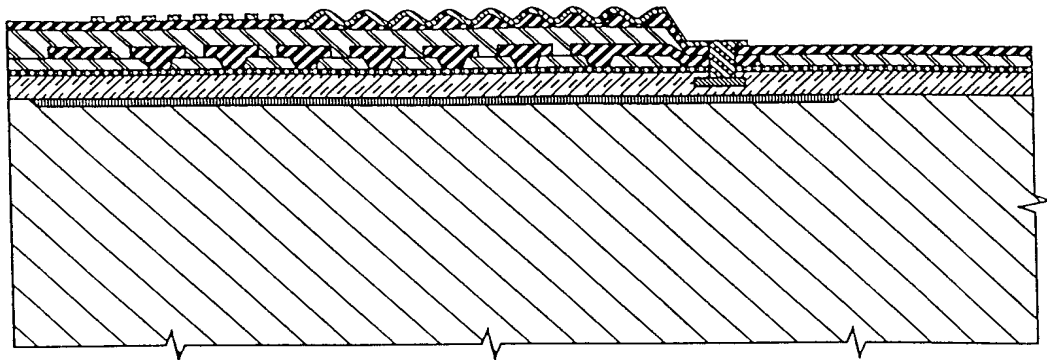


FIG. 275

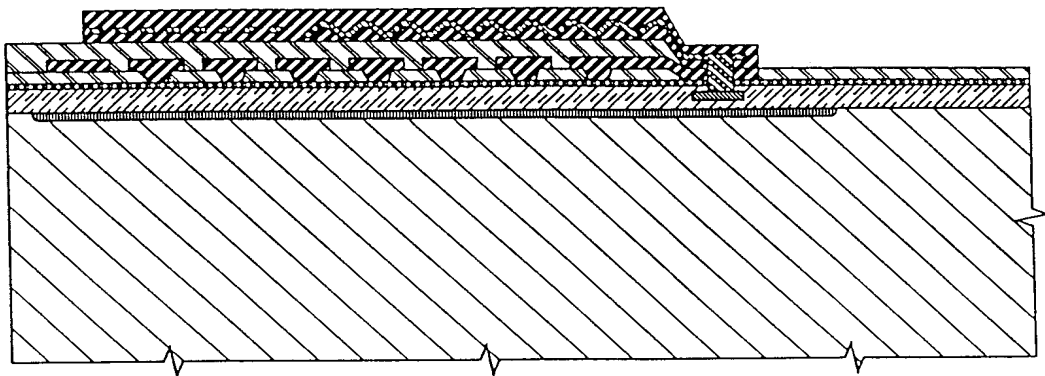


FIG. 276

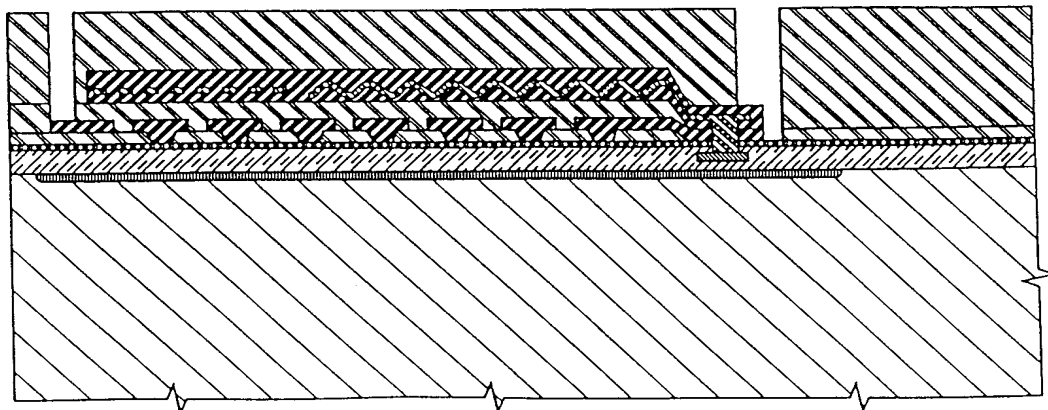


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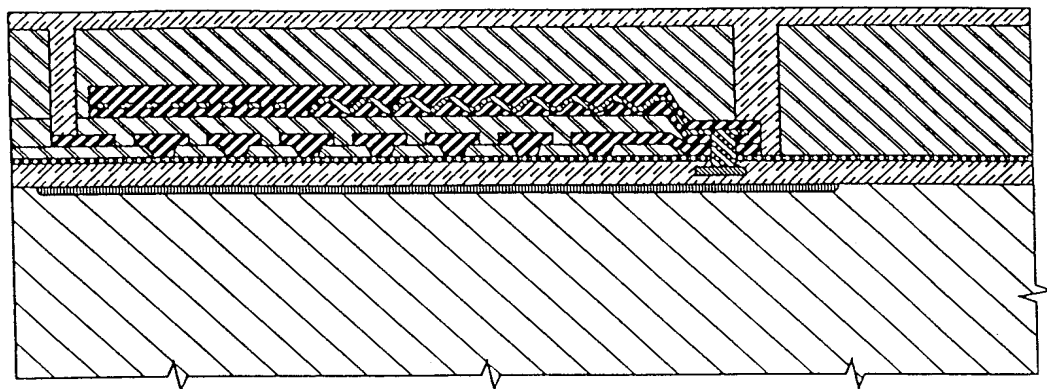


FIG. 278

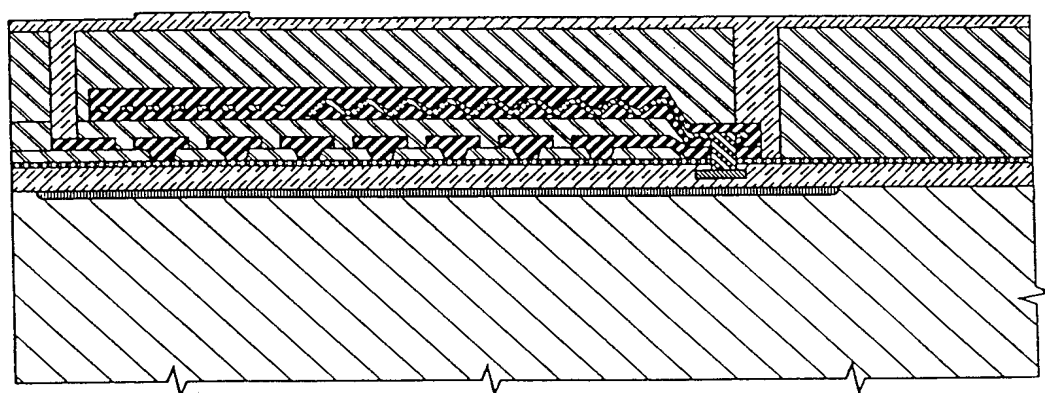


FIG. 279

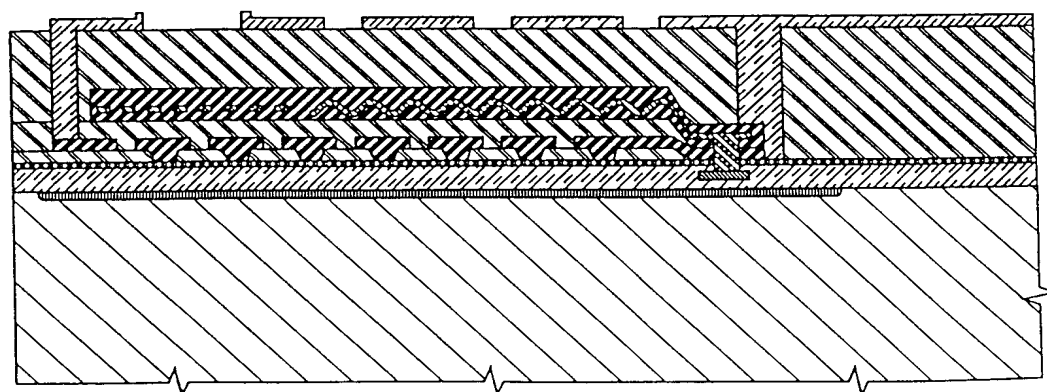


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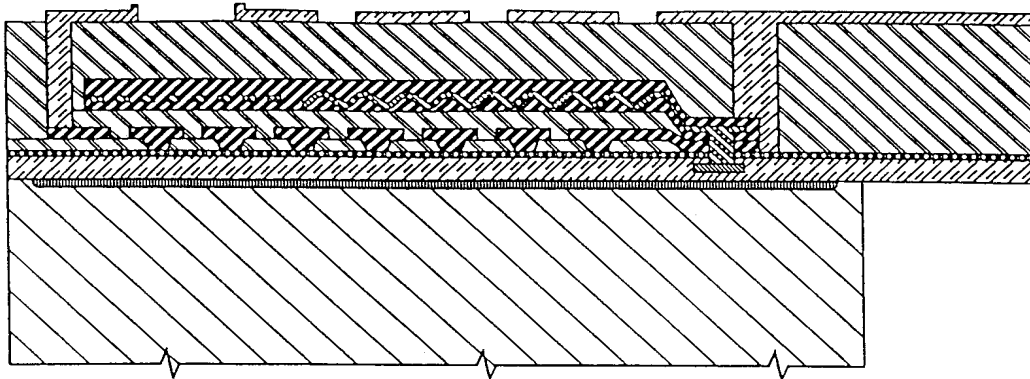


FIG. 281

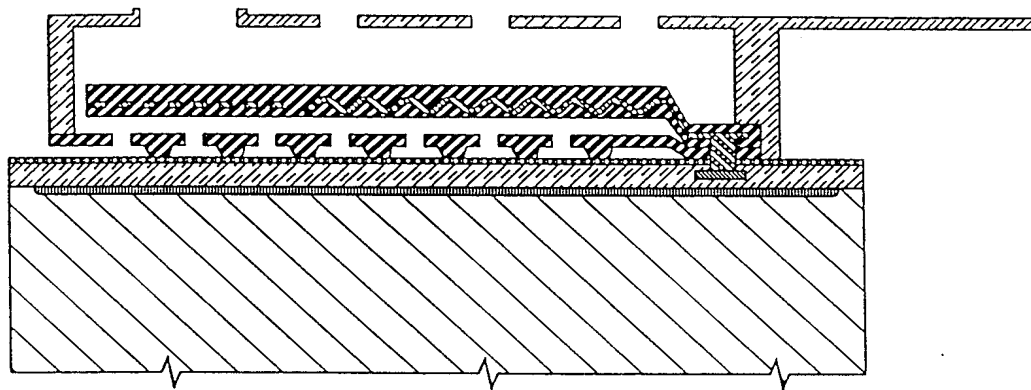


FIG. 282

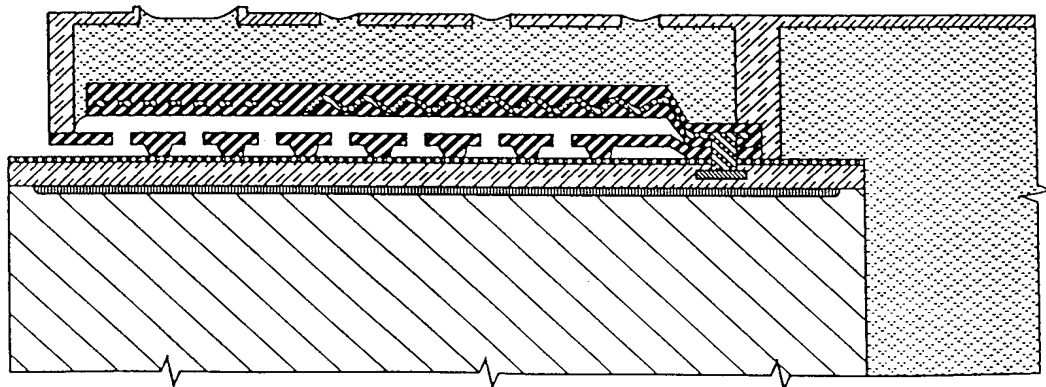
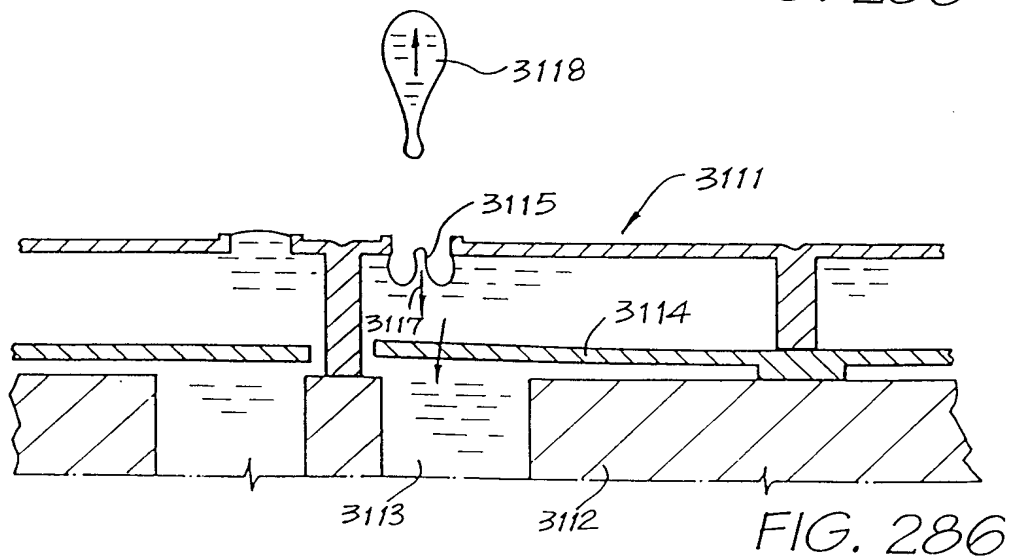
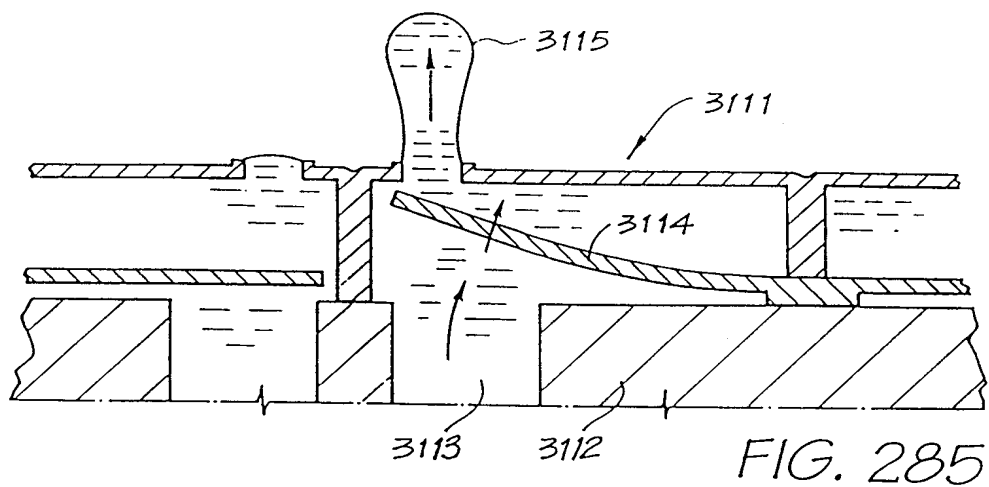
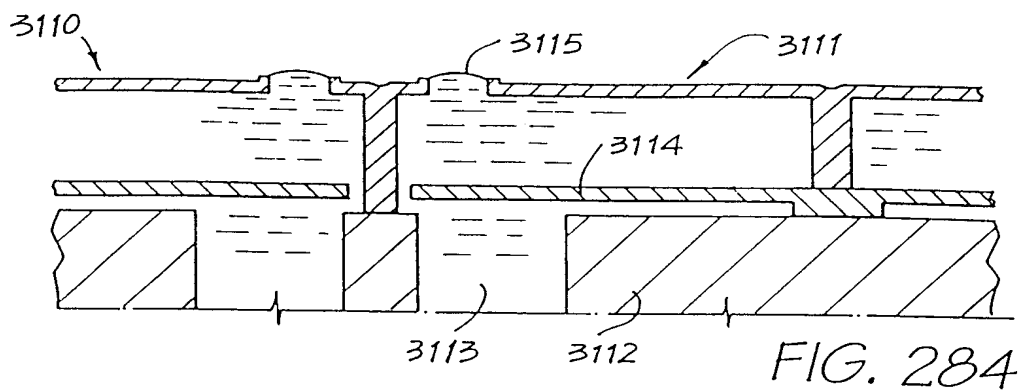


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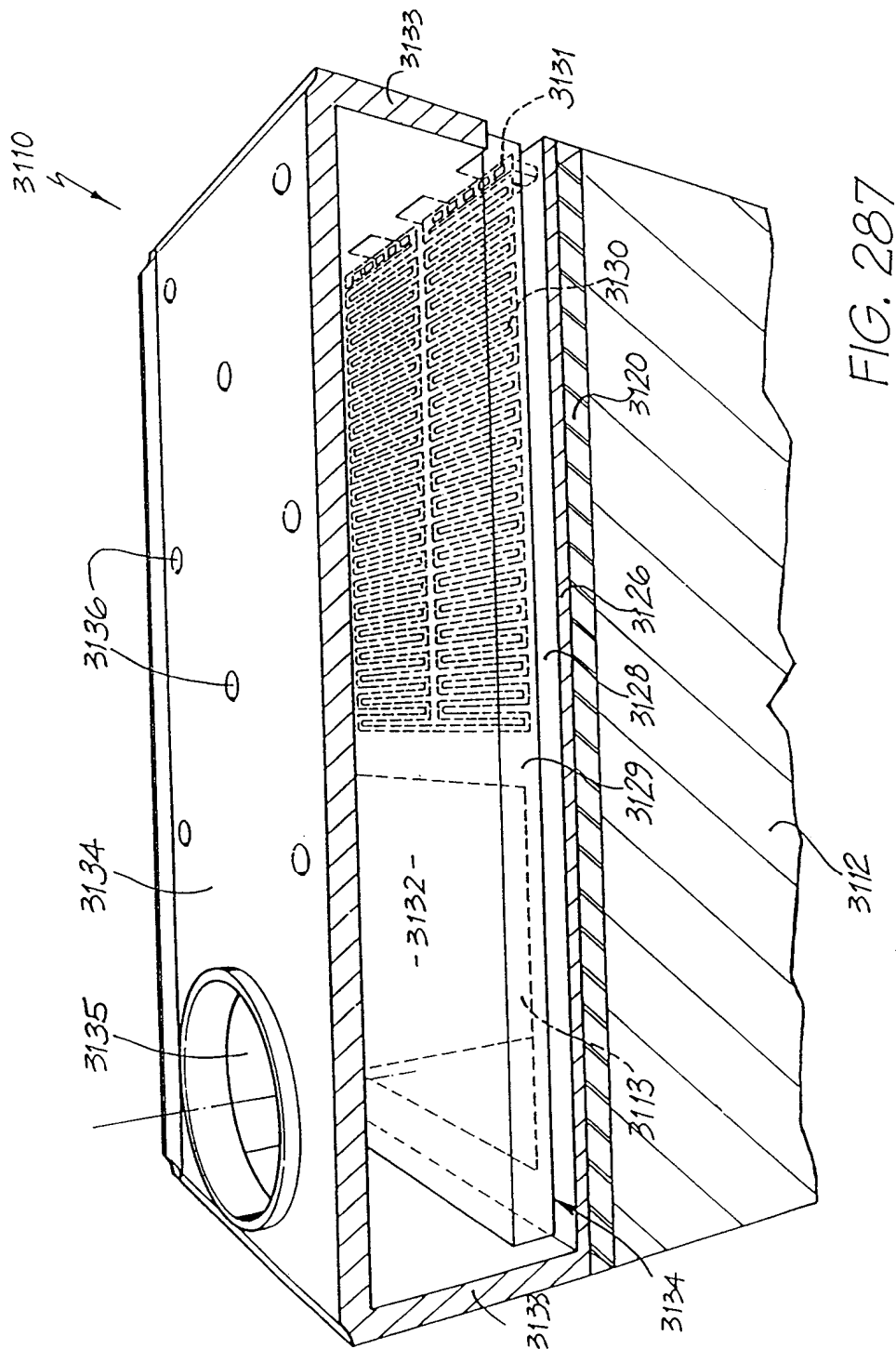


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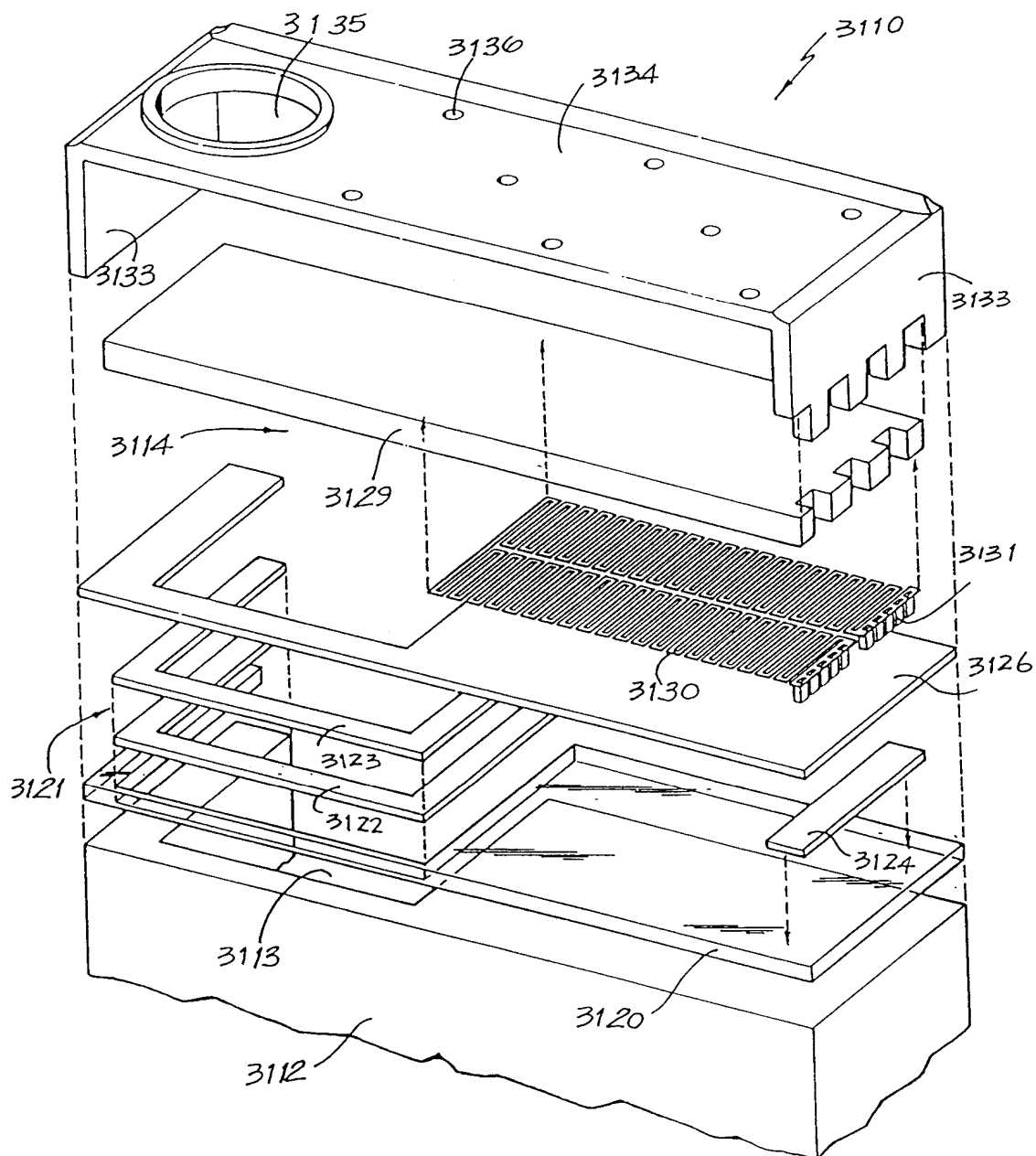
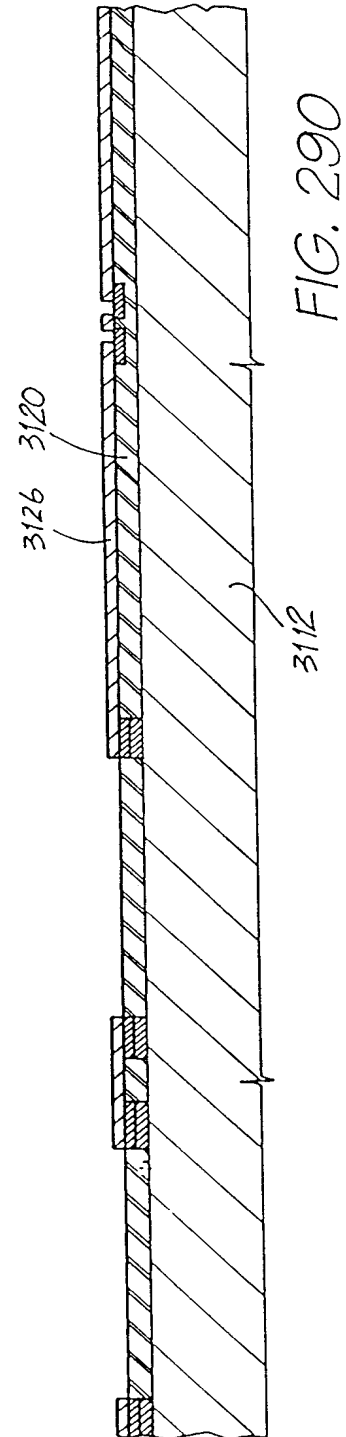
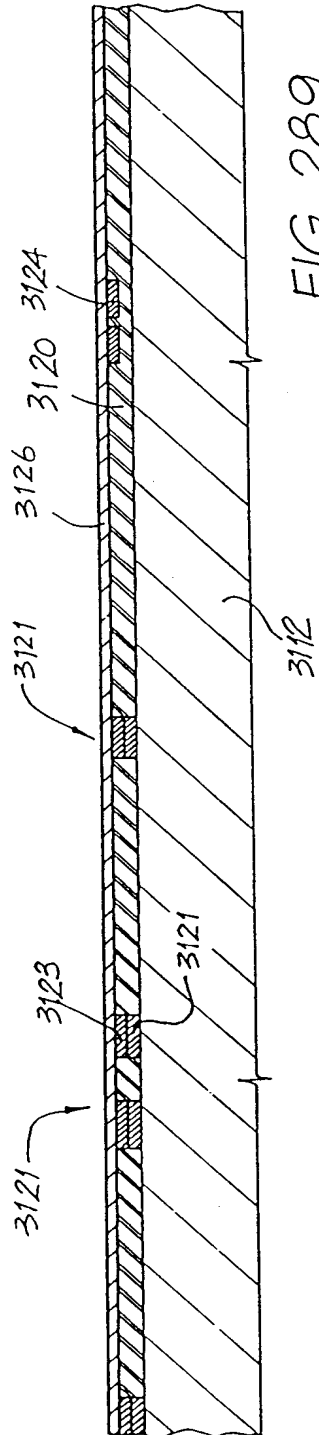


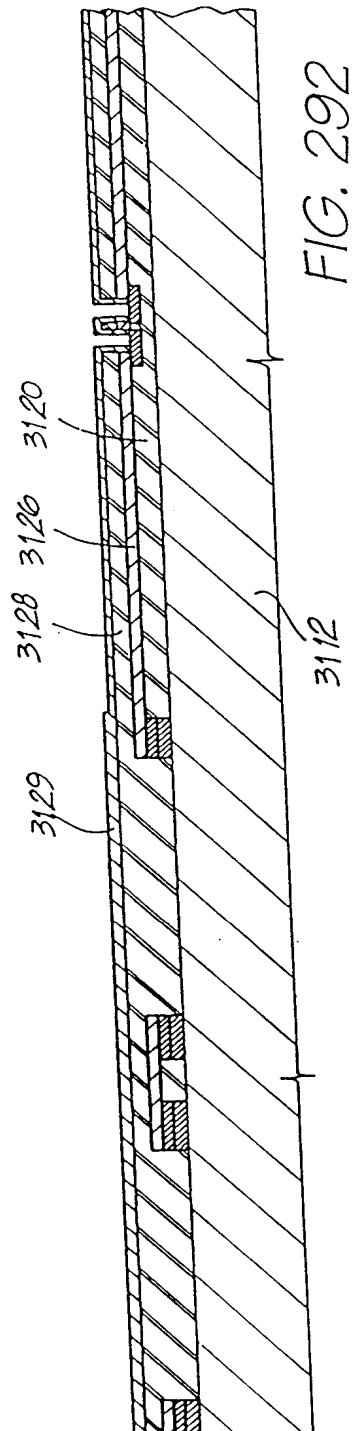
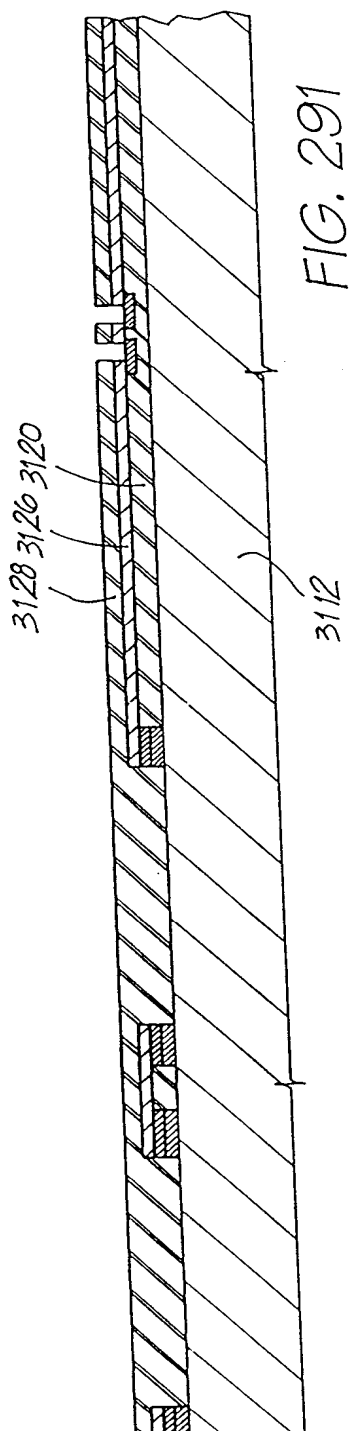
FIG. 288

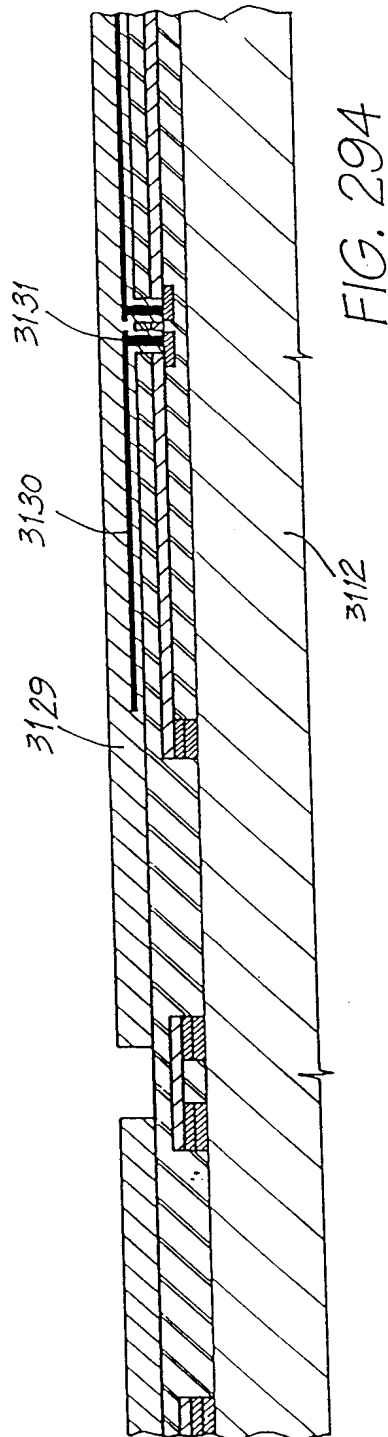
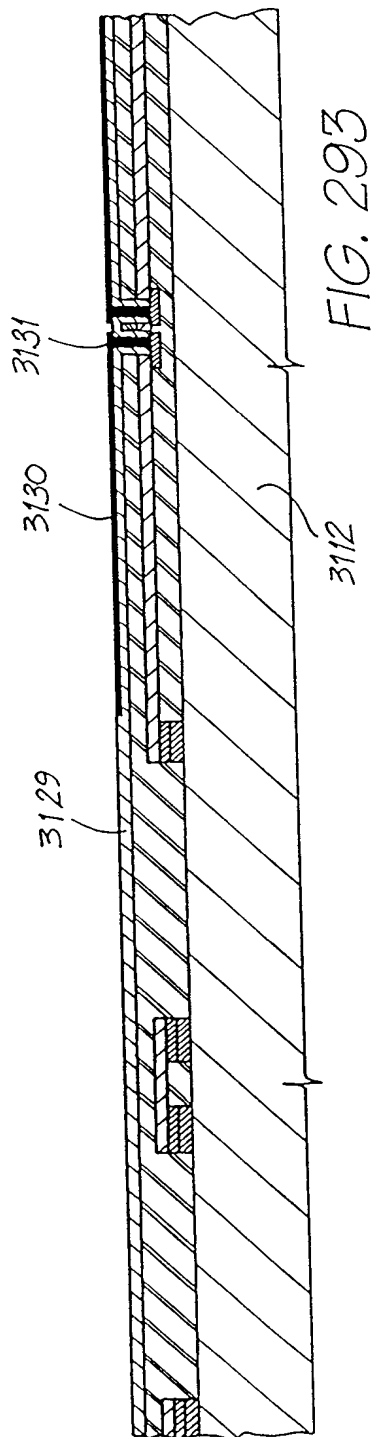
SUBSTITUTE SHEET (Rule 26) (RO/AU)

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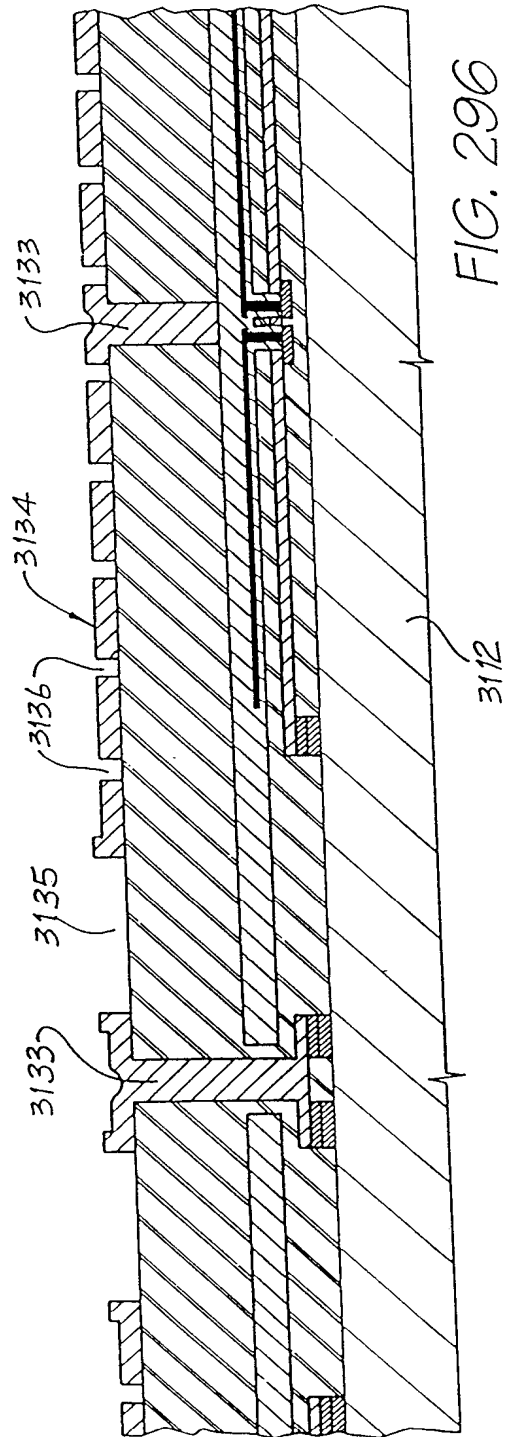
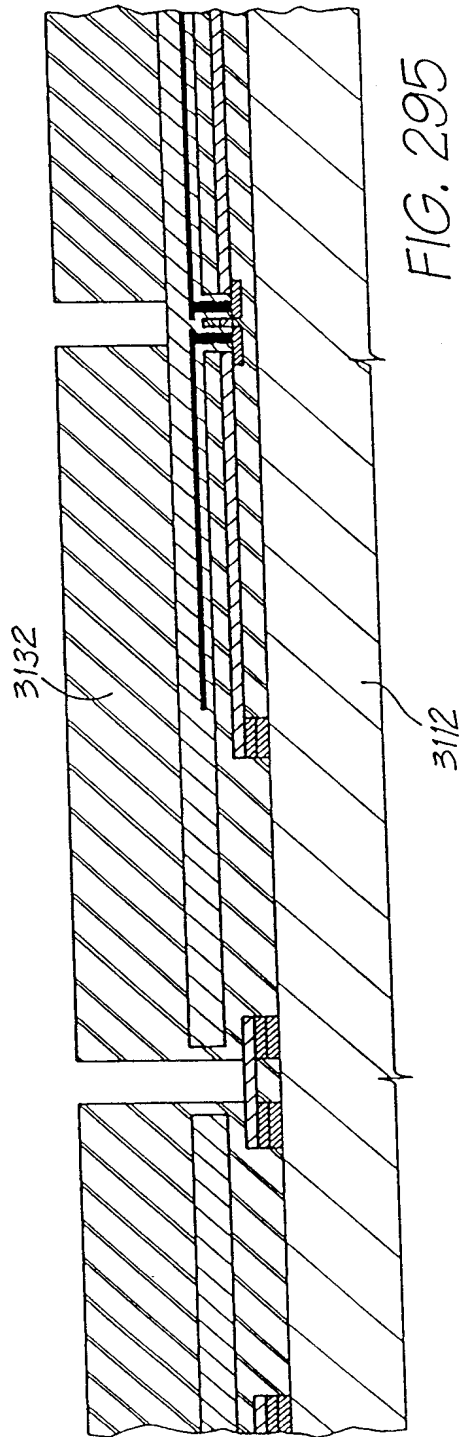


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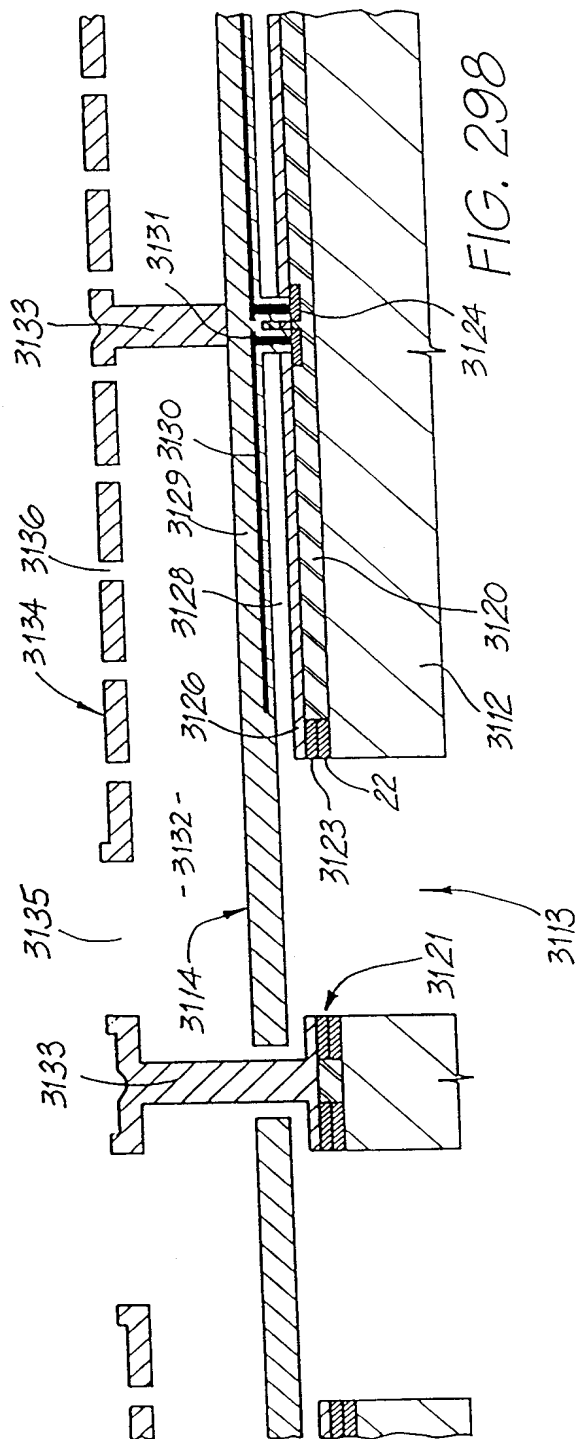
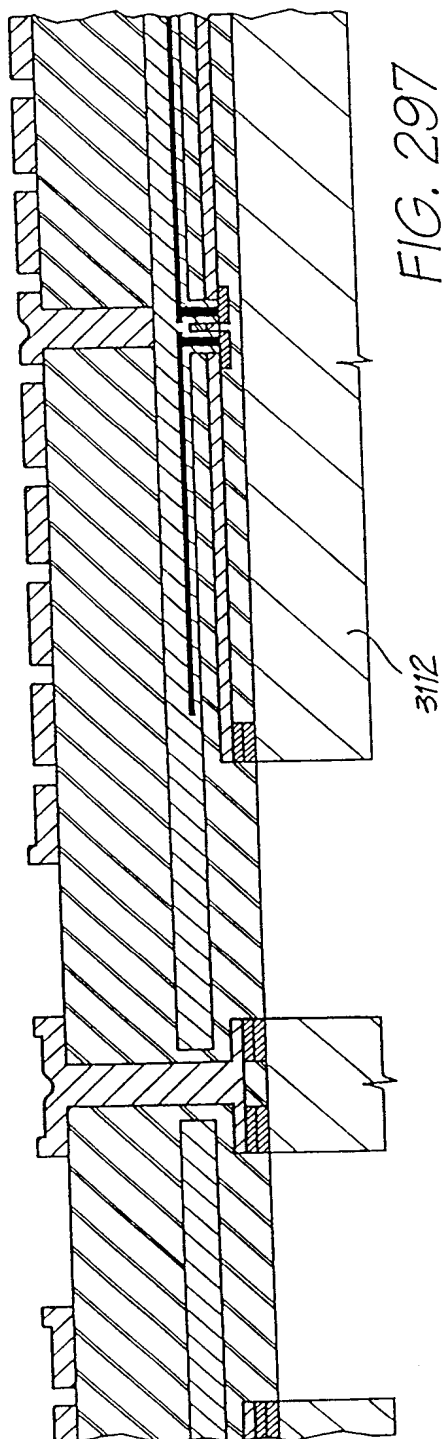




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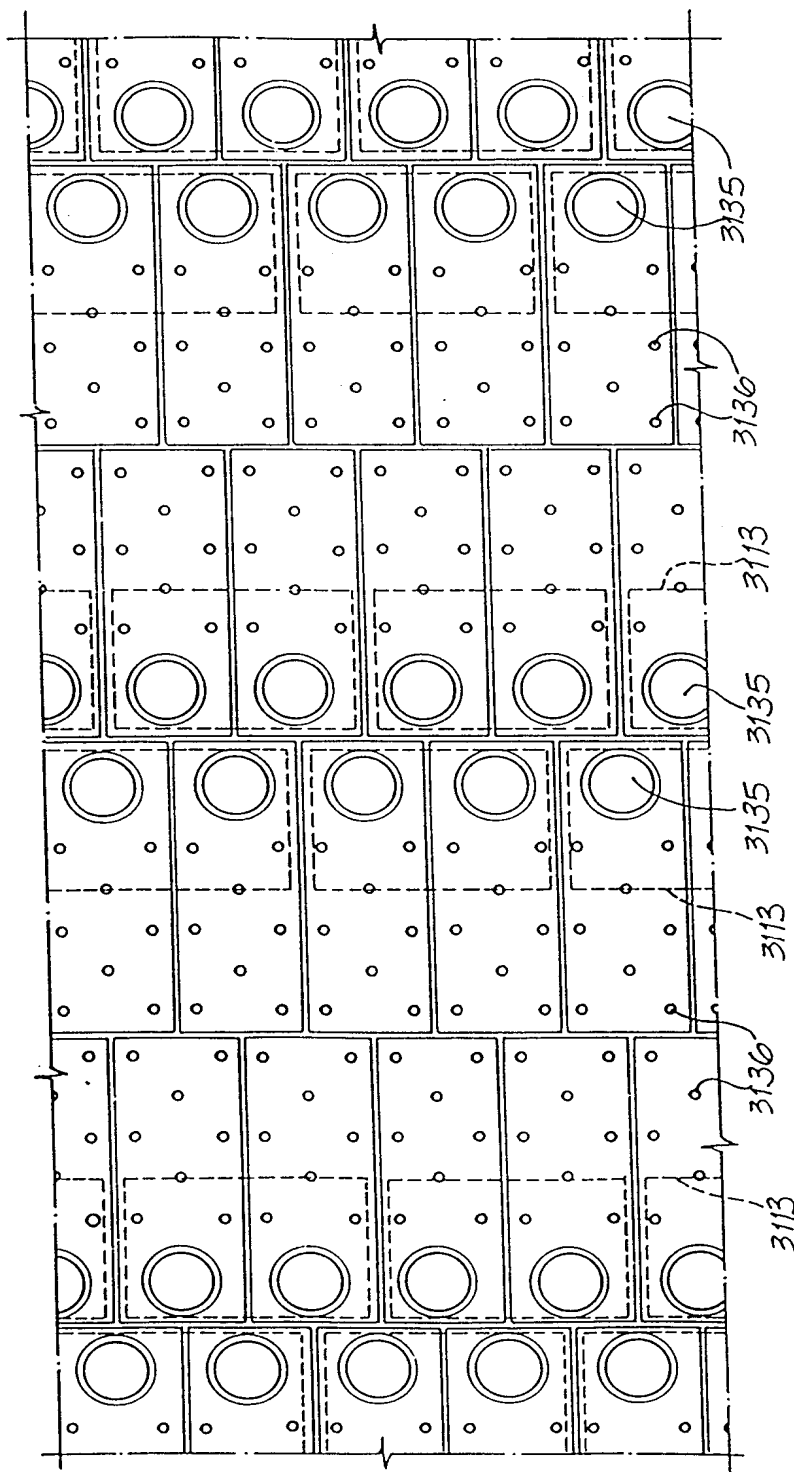
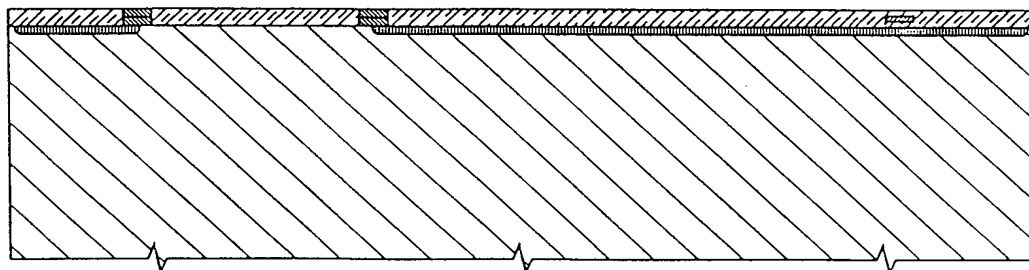
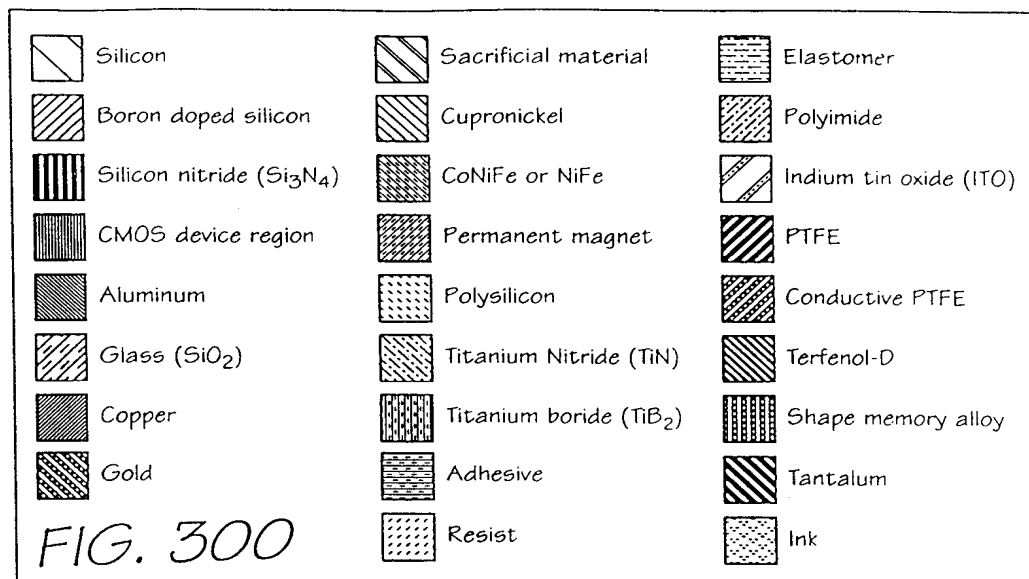
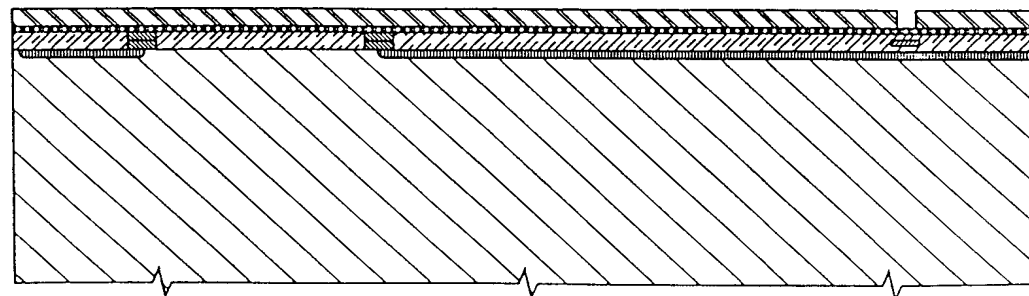


FIG. 299

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*FIG. 301**FIG. 302*

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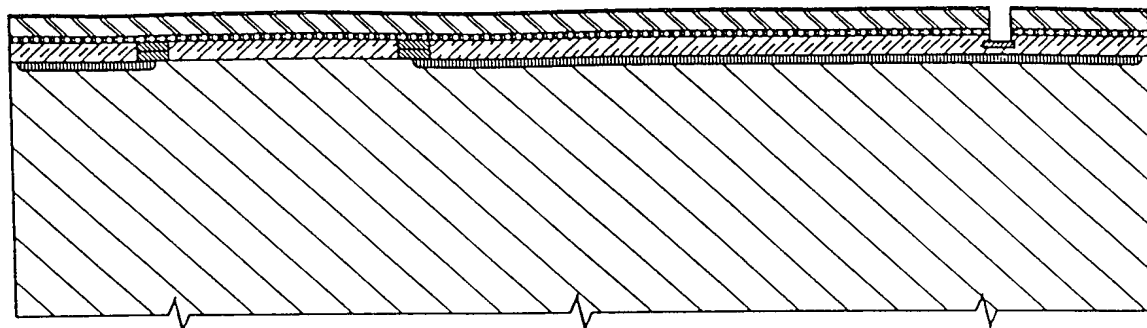


FIG. 303

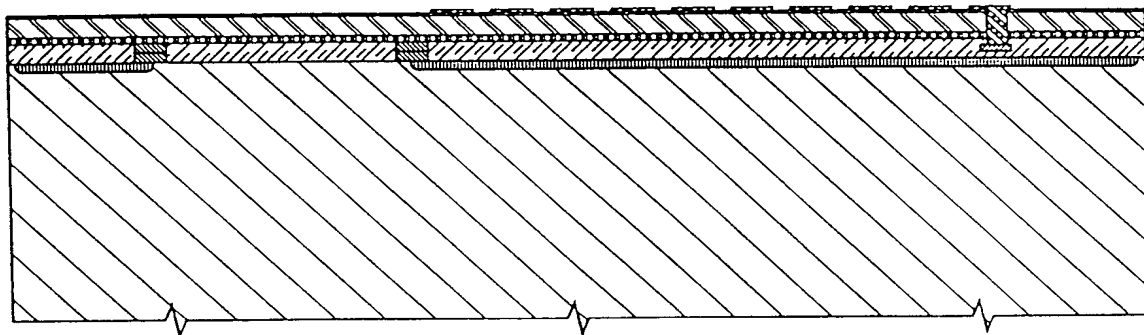


FIG. 304

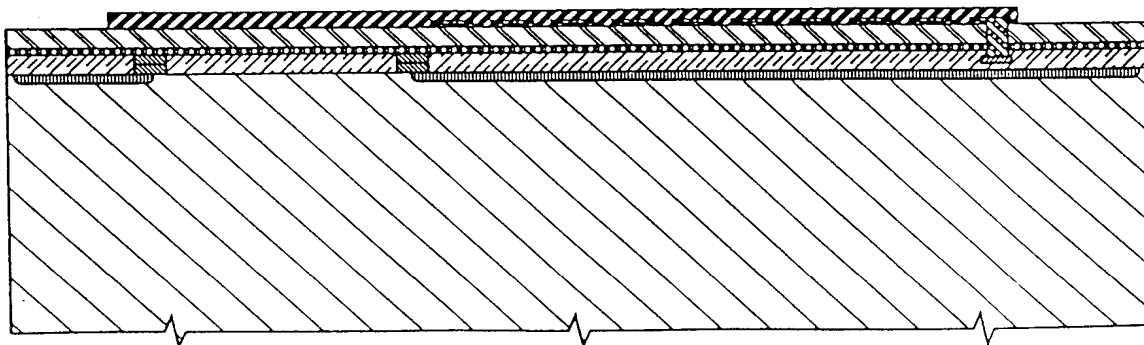


FIG. 305

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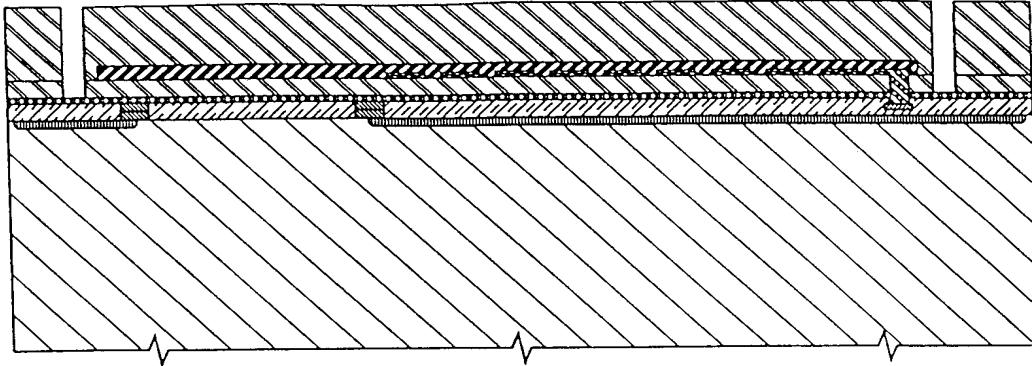


FIG. 306

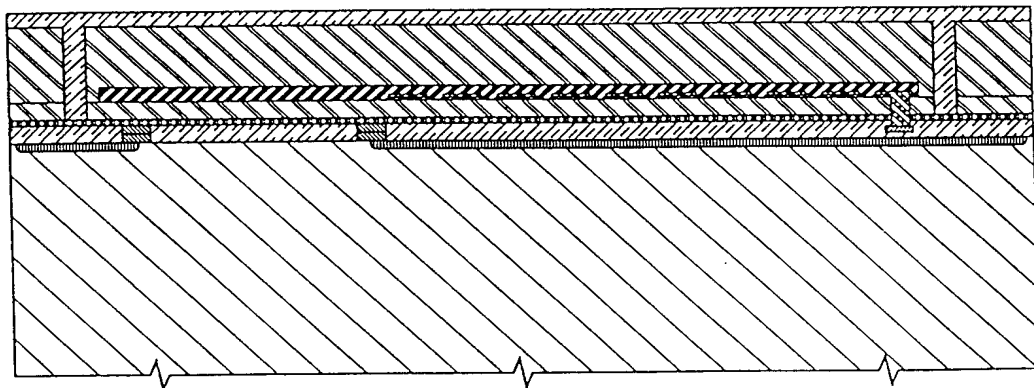


FIG. 307

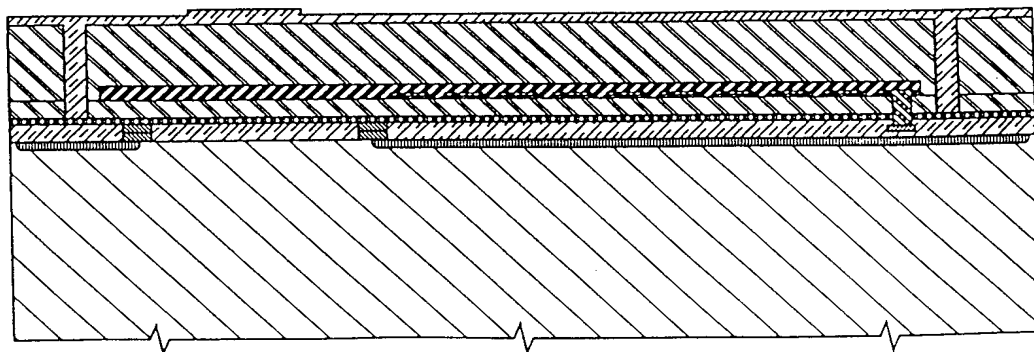


FIG. 308

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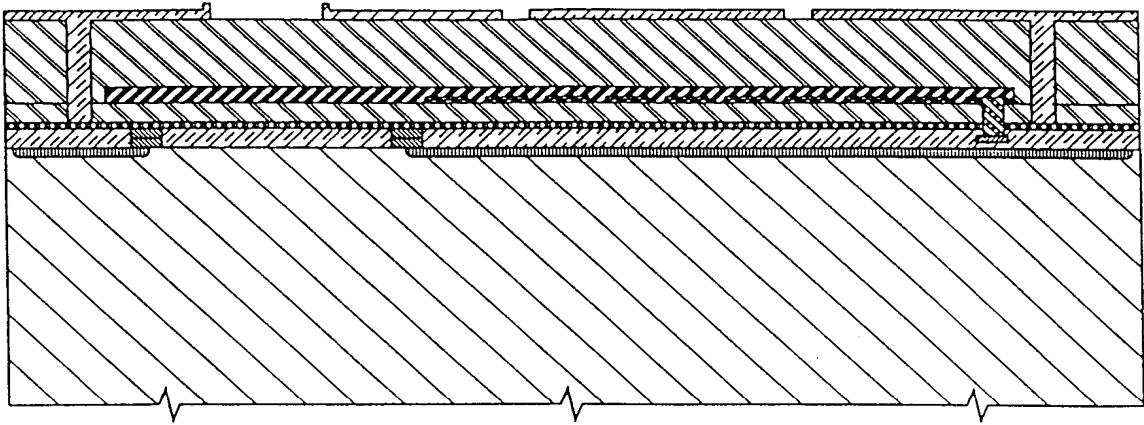


FIG. 309

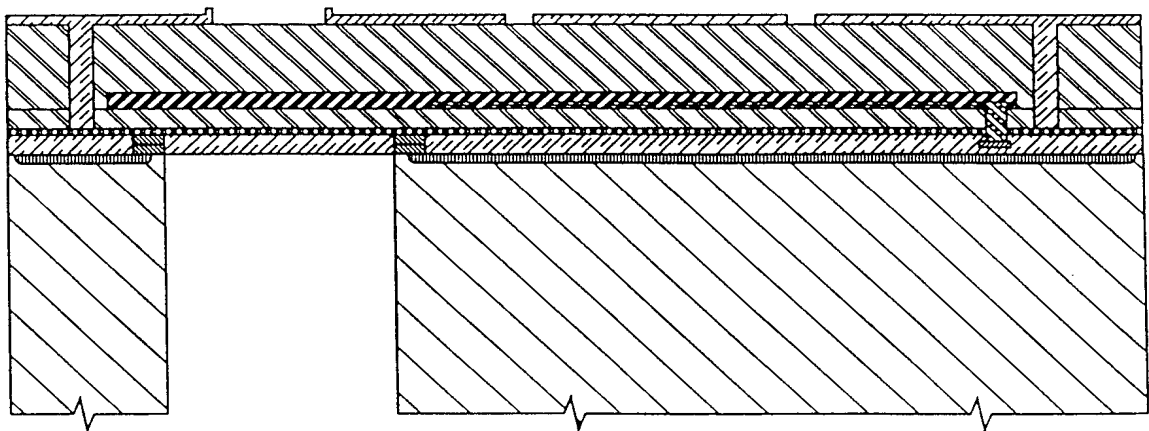


FIG. 310

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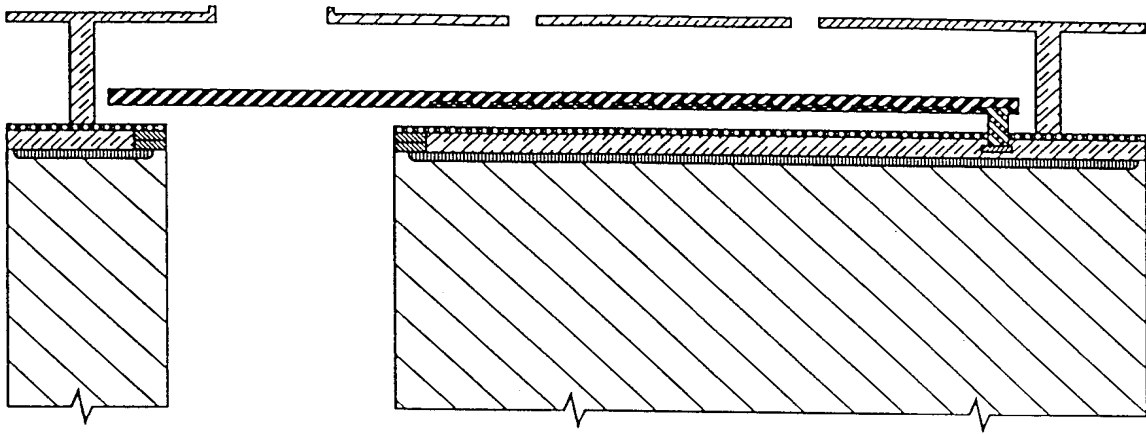


FIG. 311

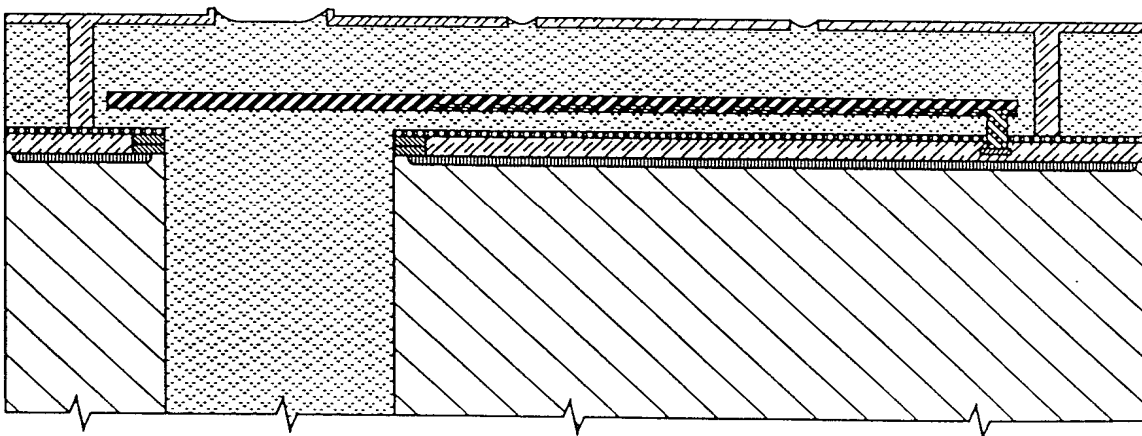


FIG. 312

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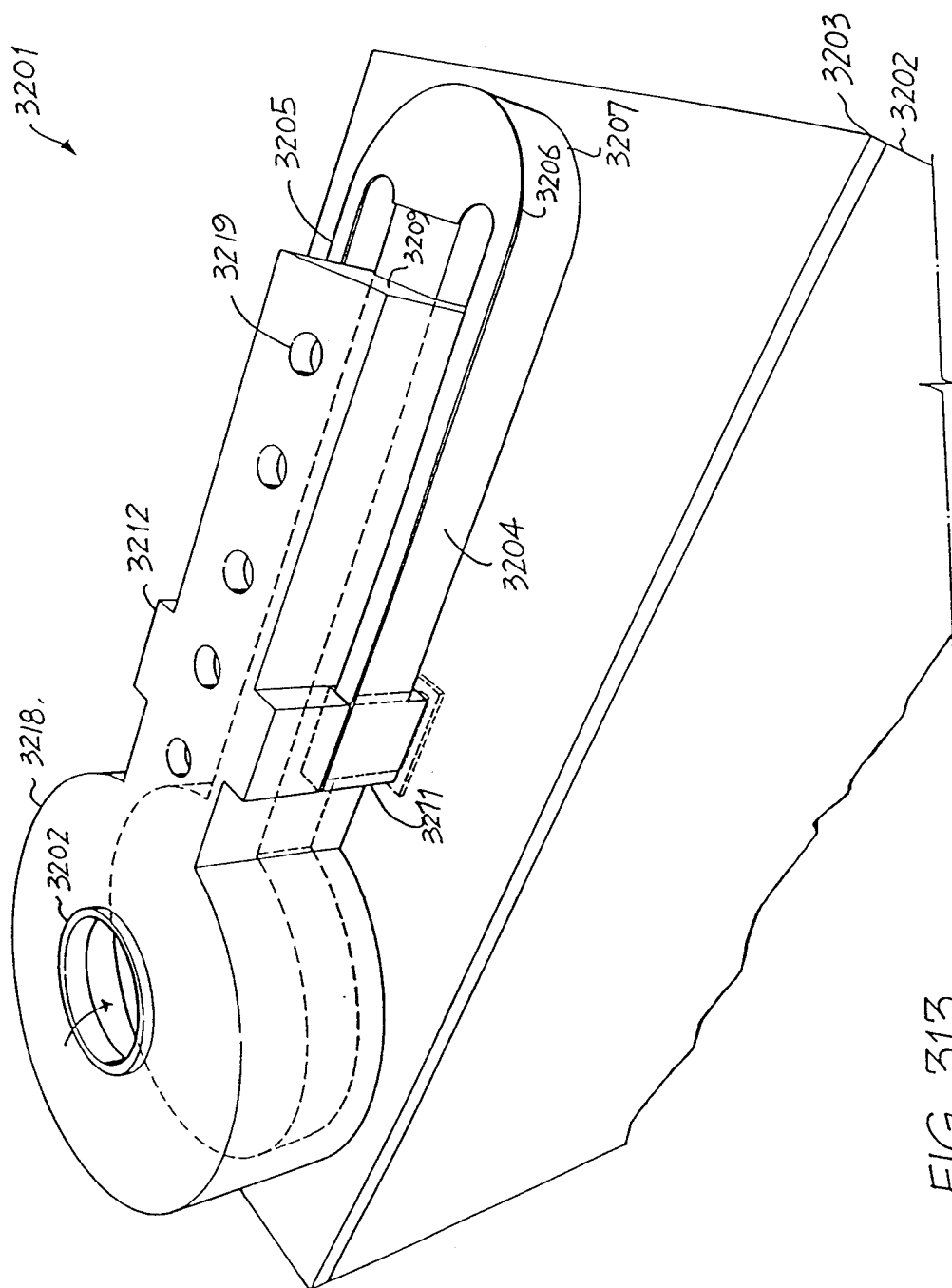
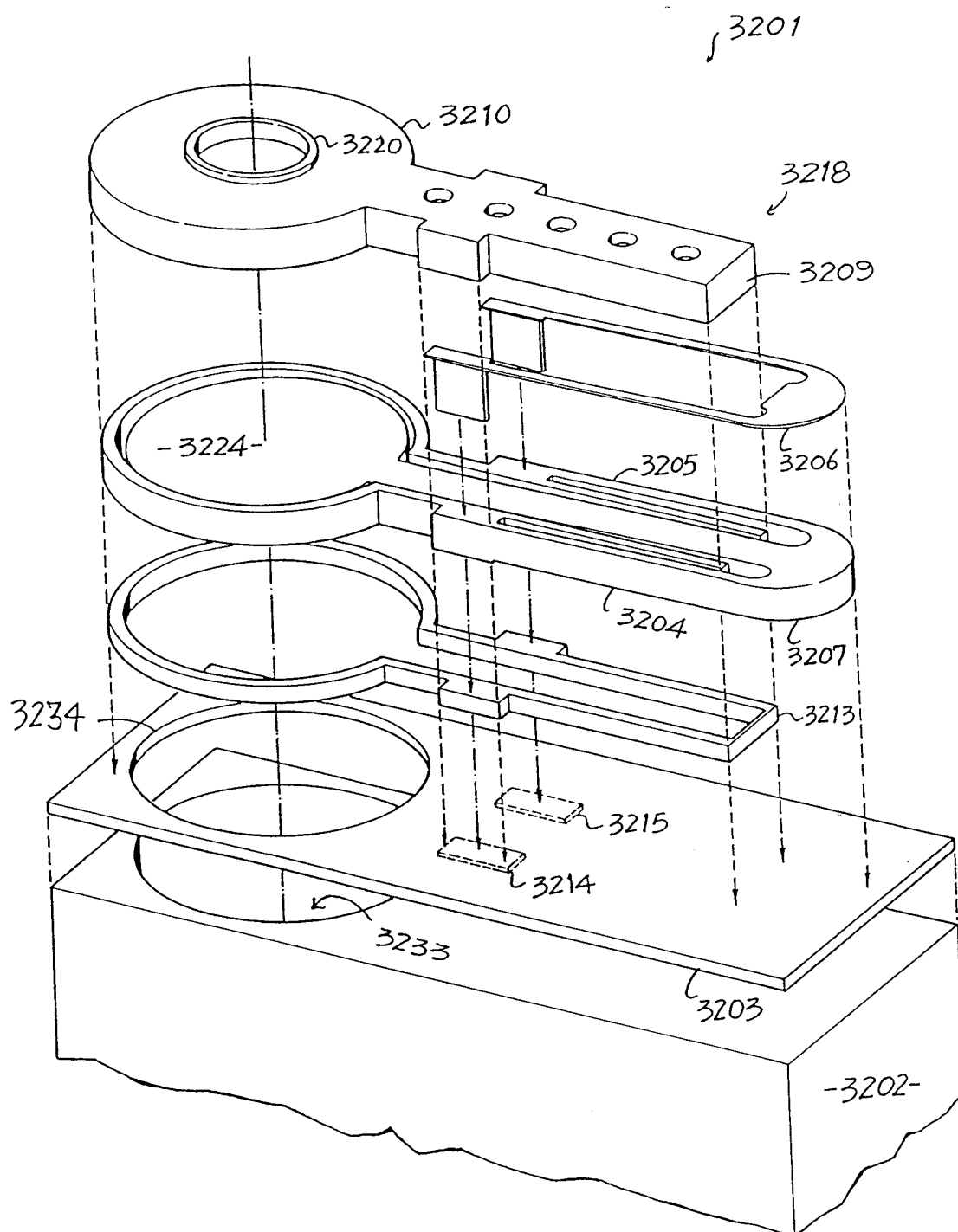


FIG. 313

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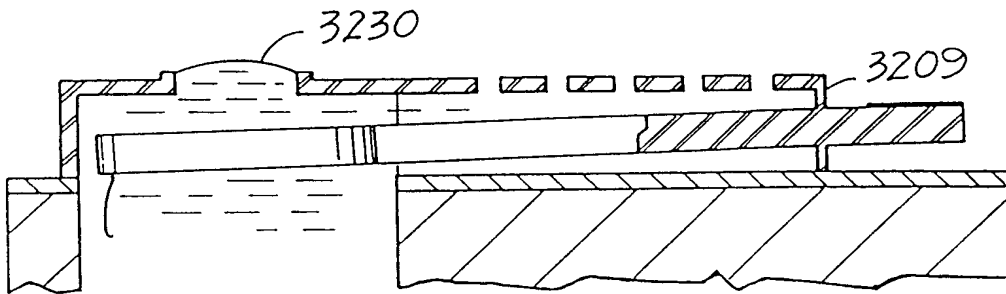


FIG. 315

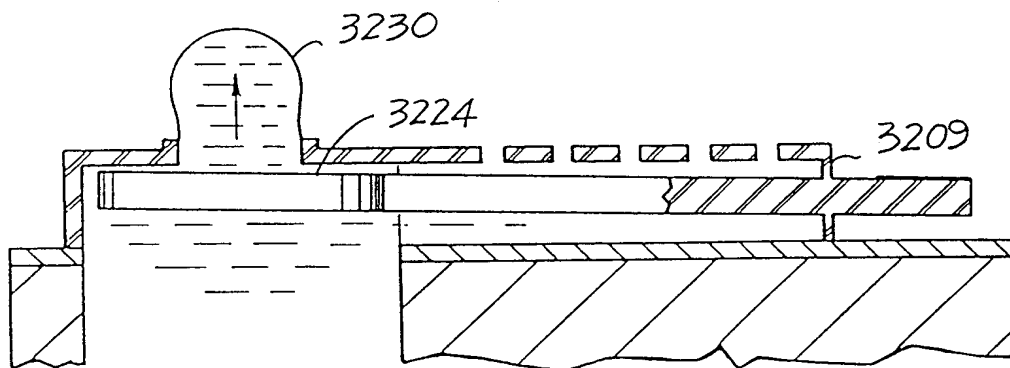


FIG. 316

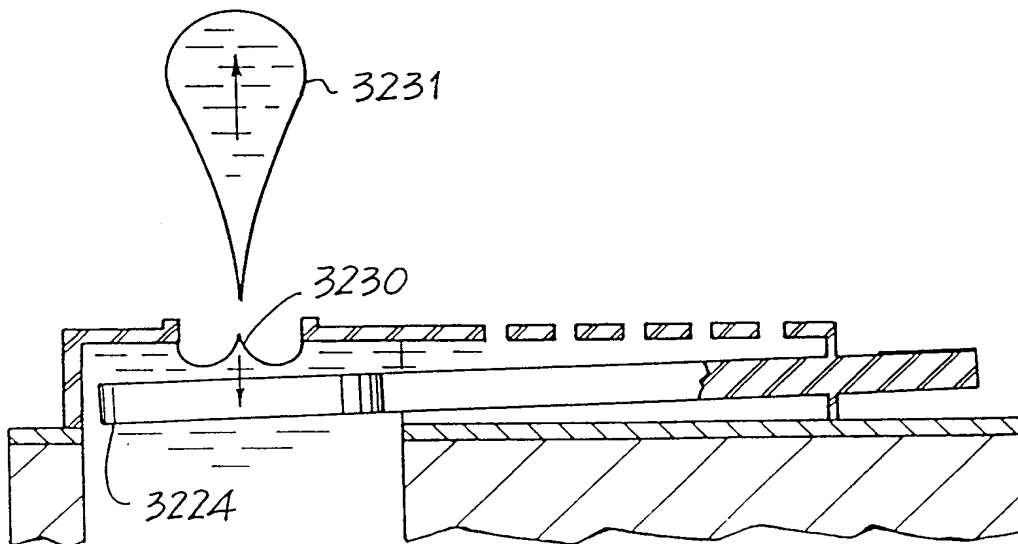


FIG. 317

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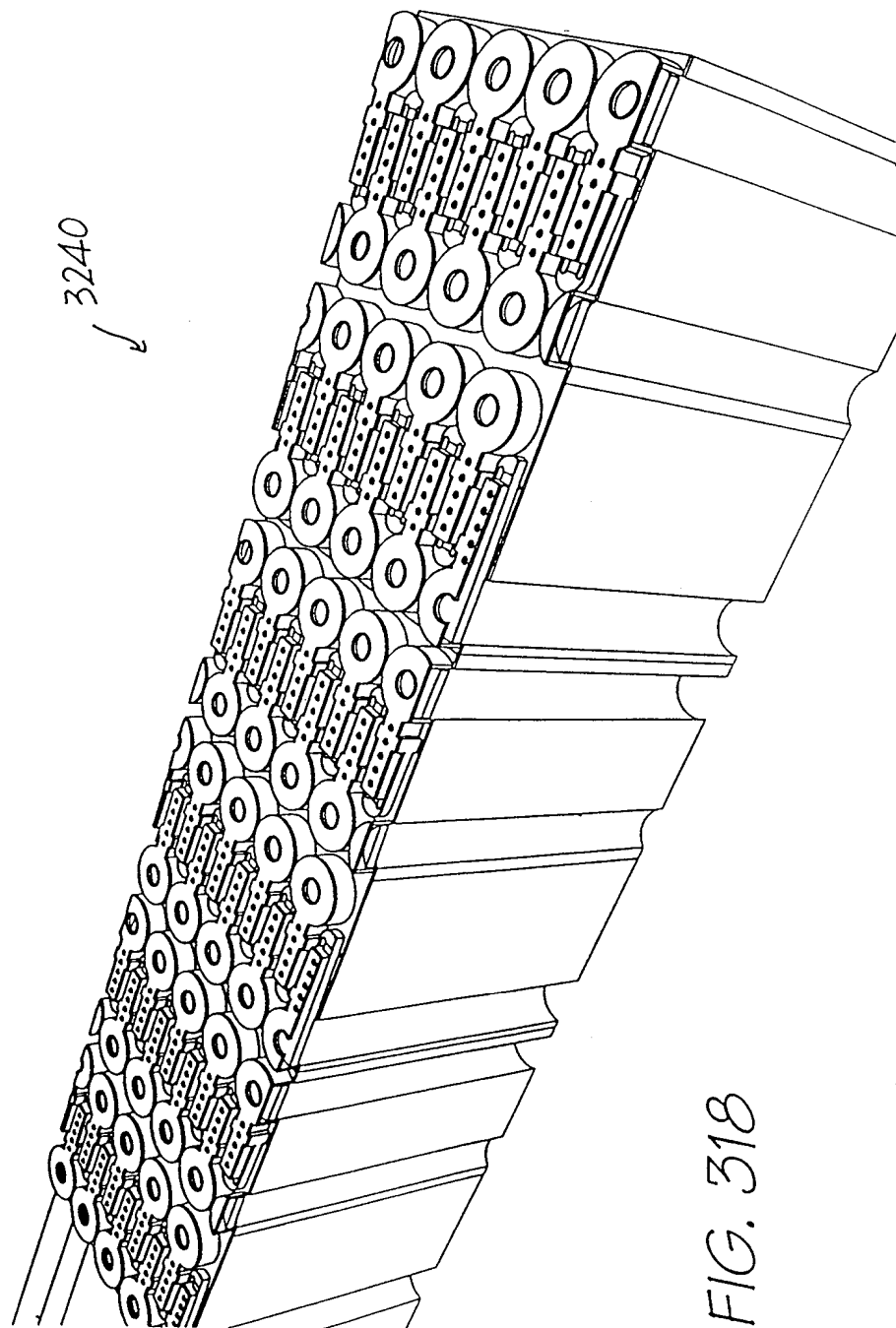
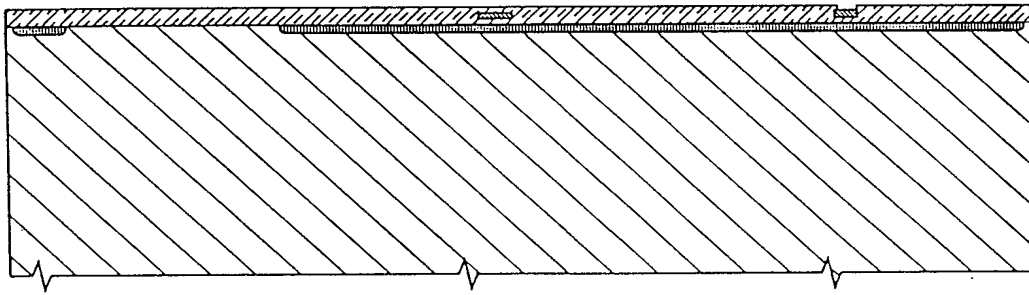
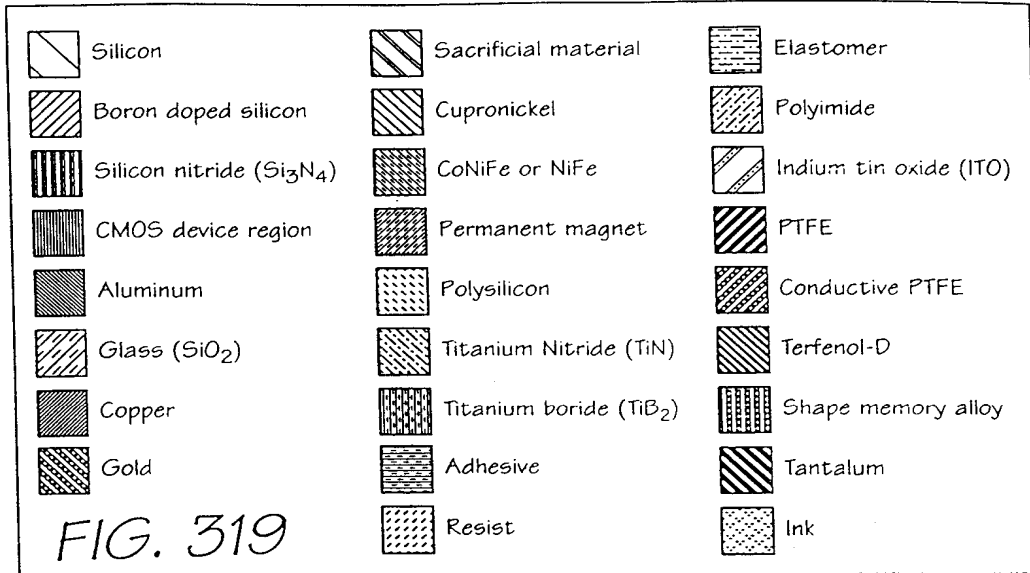
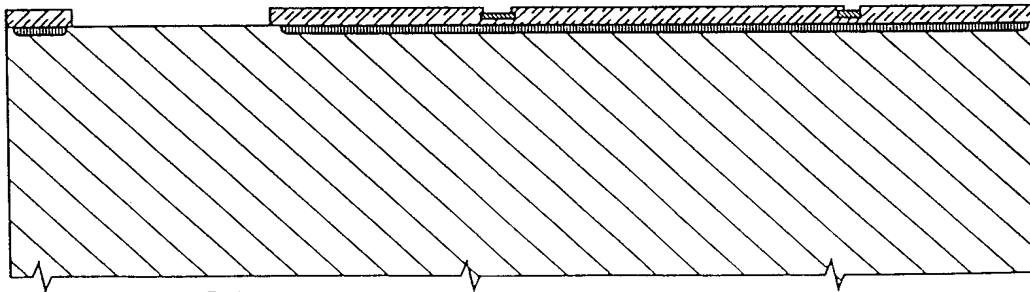


FIG. 318

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*FIG. 320**FIG. 321*

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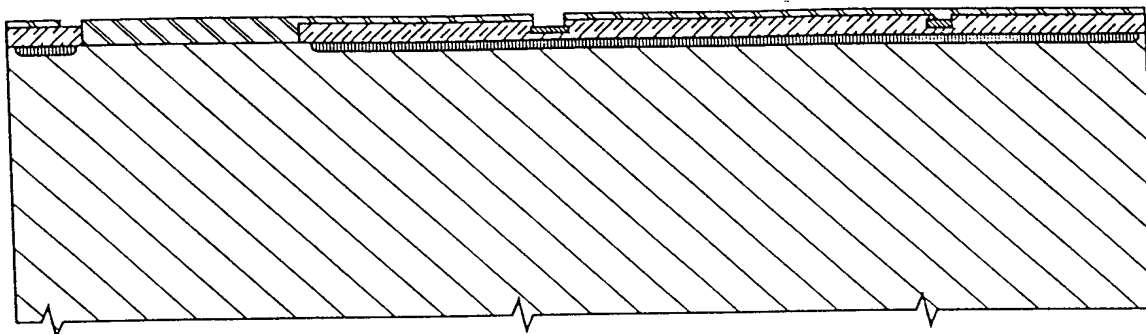


FIG. 322

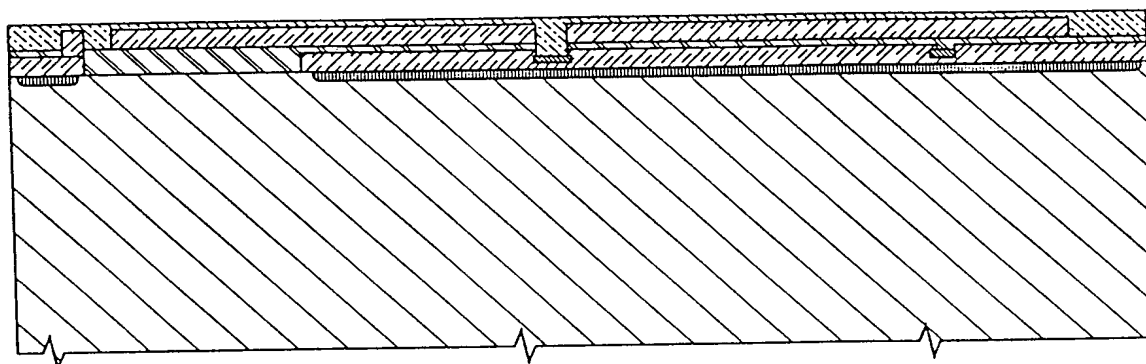


FIG. 323

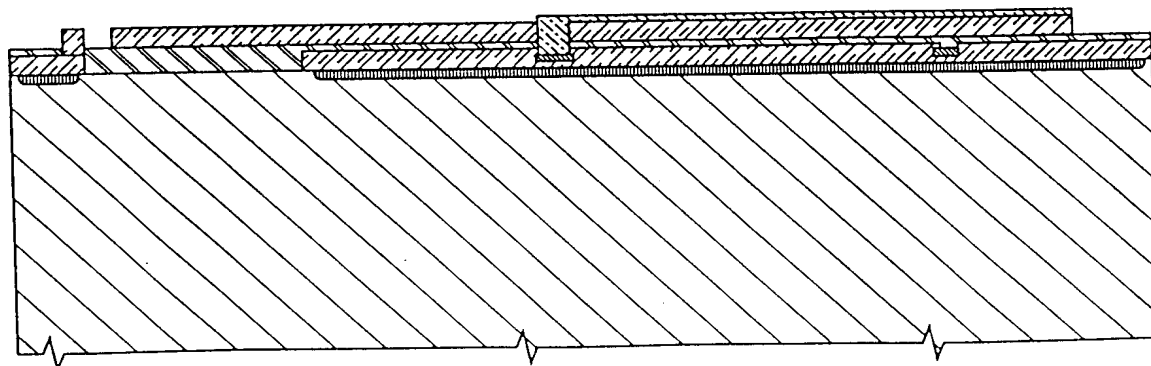


FIG. 324

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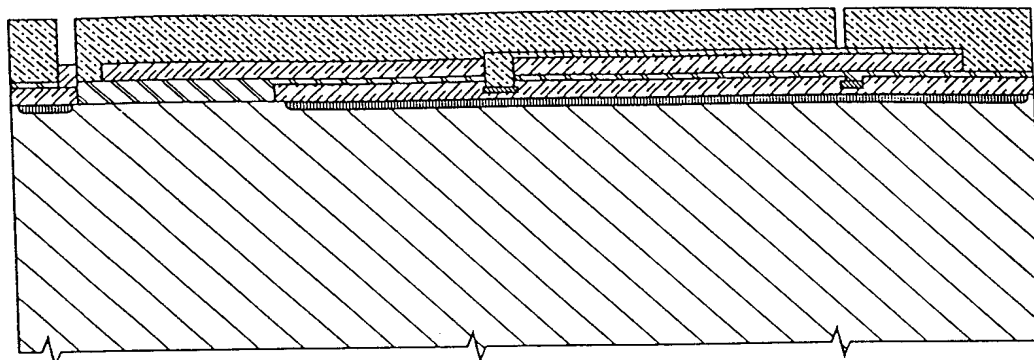


FIG. 325

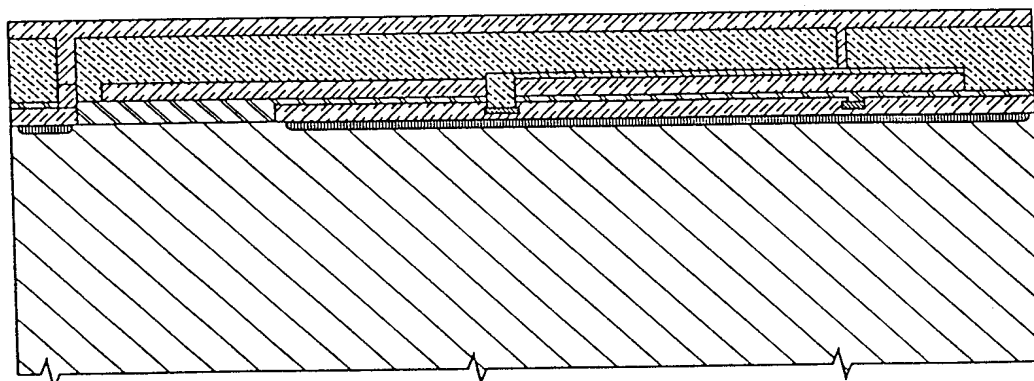


FIG. 326

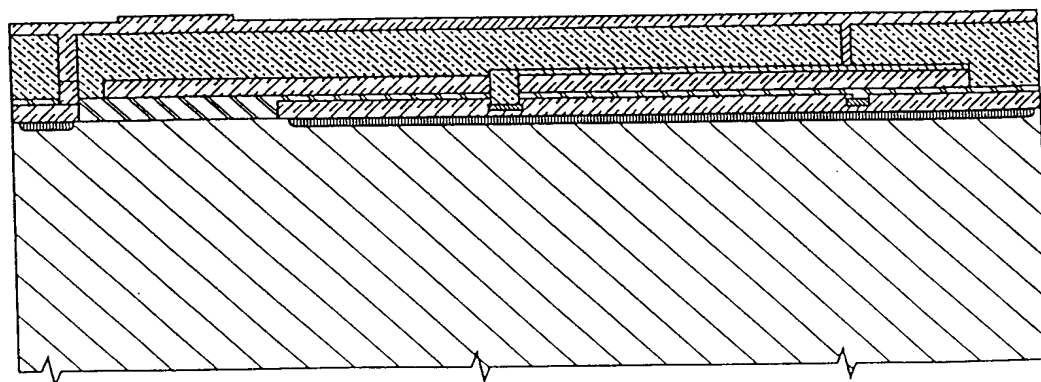


FIG. 327

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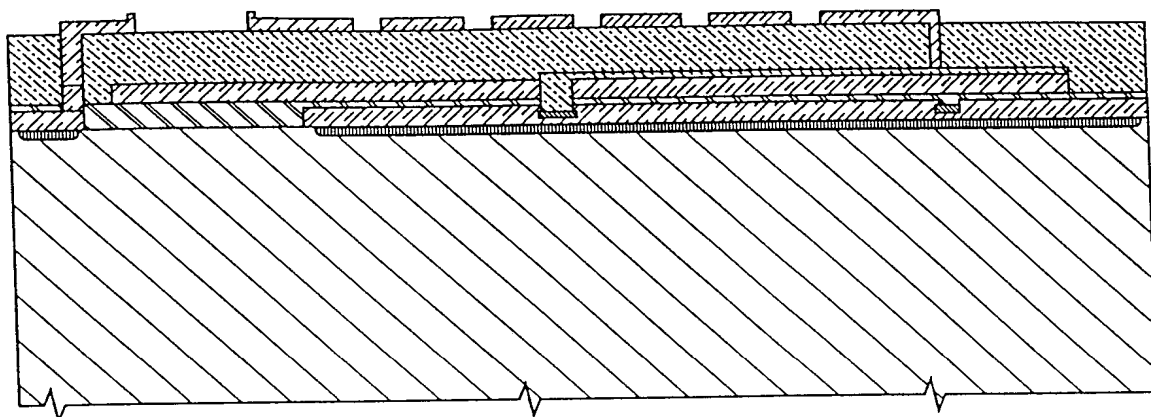


FIG. 328

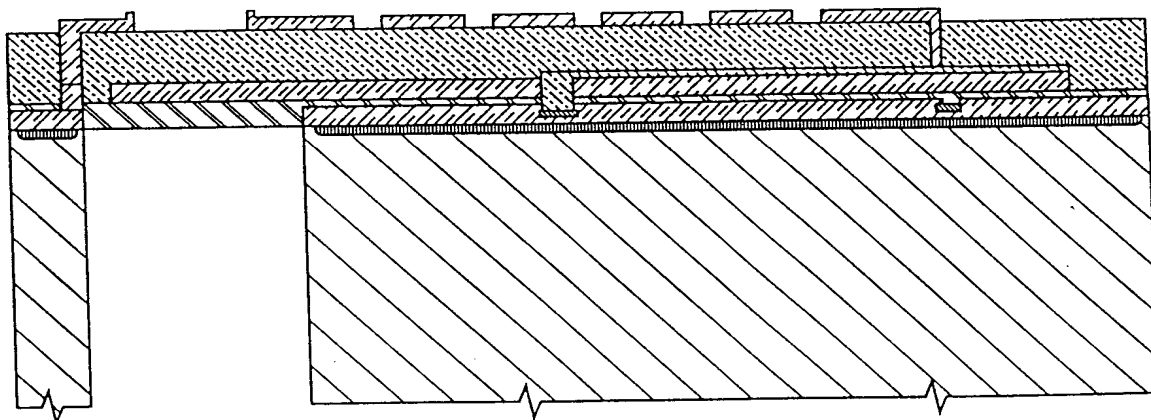


FIG. 329

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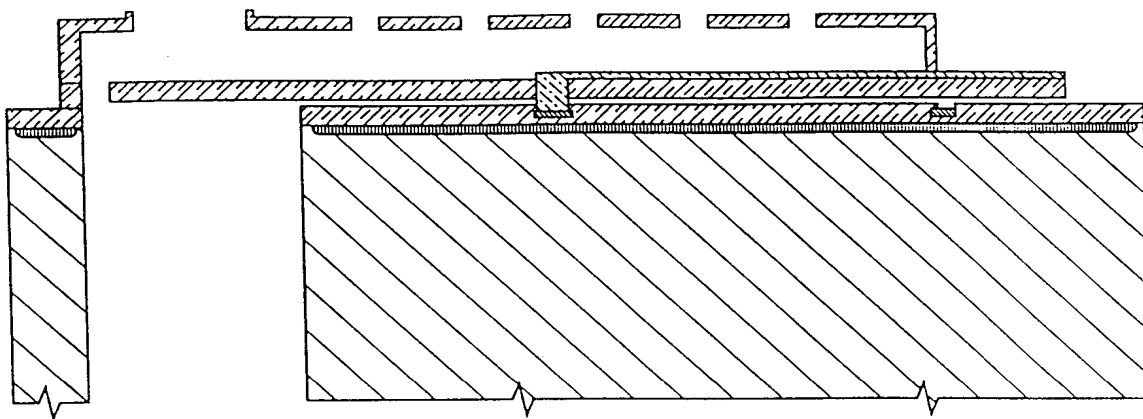


FIG. 330

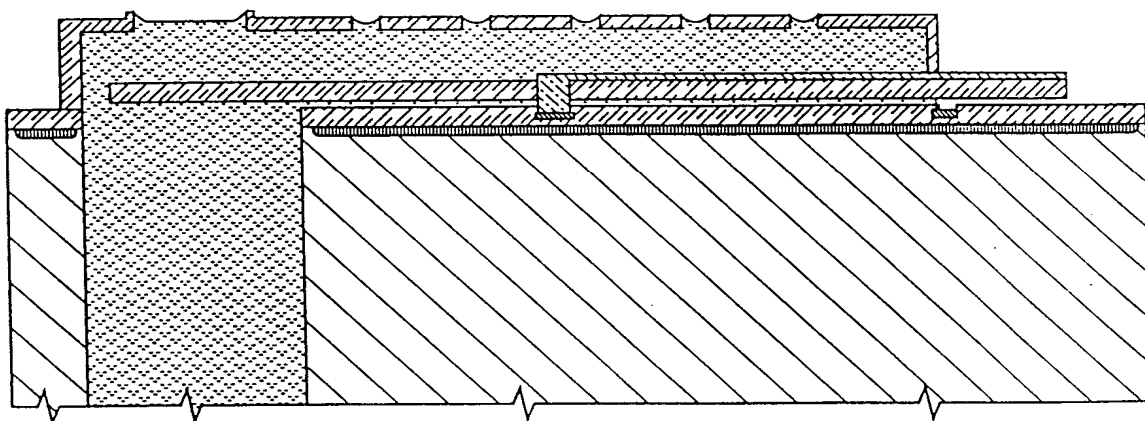


FIG. 331

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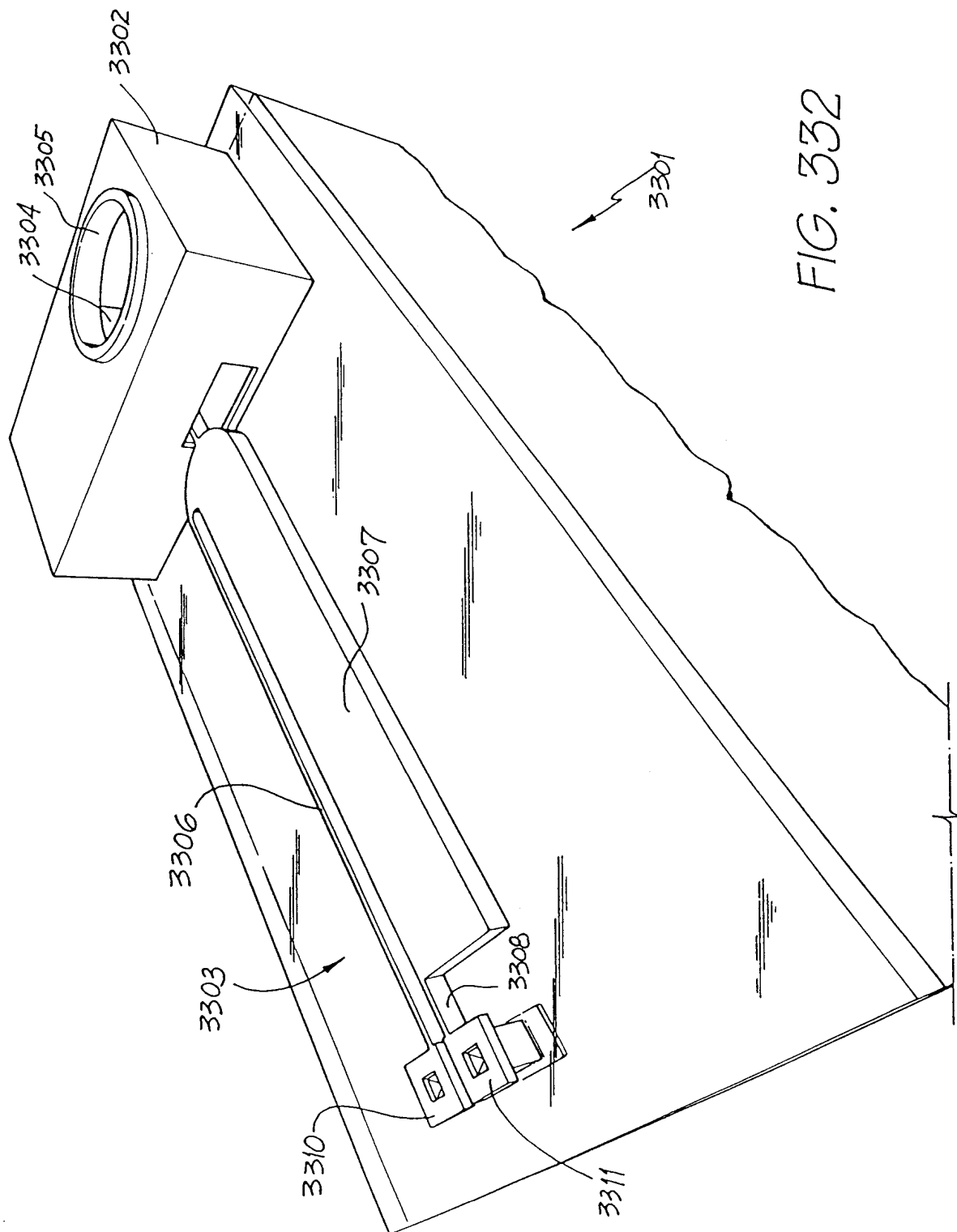
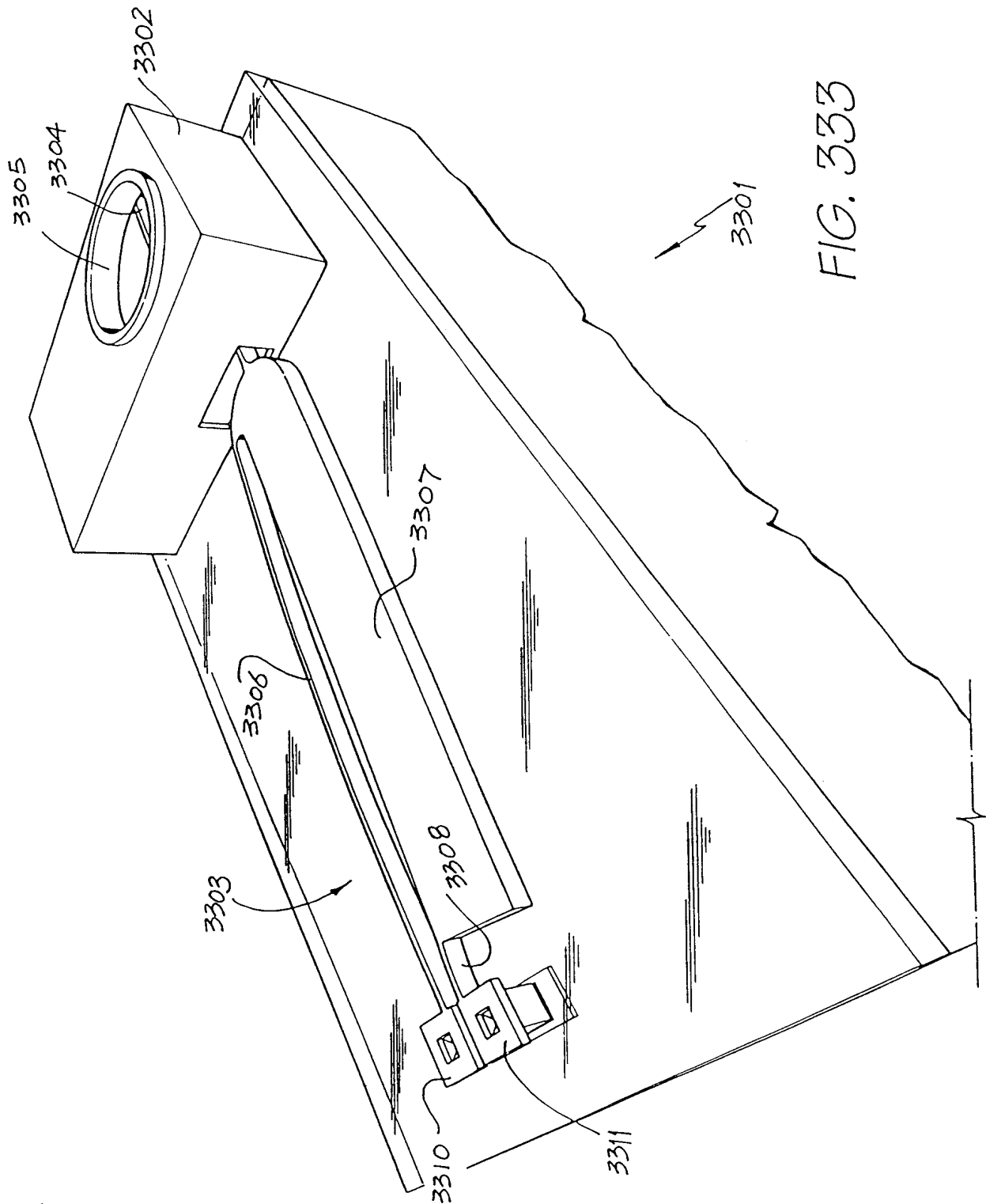
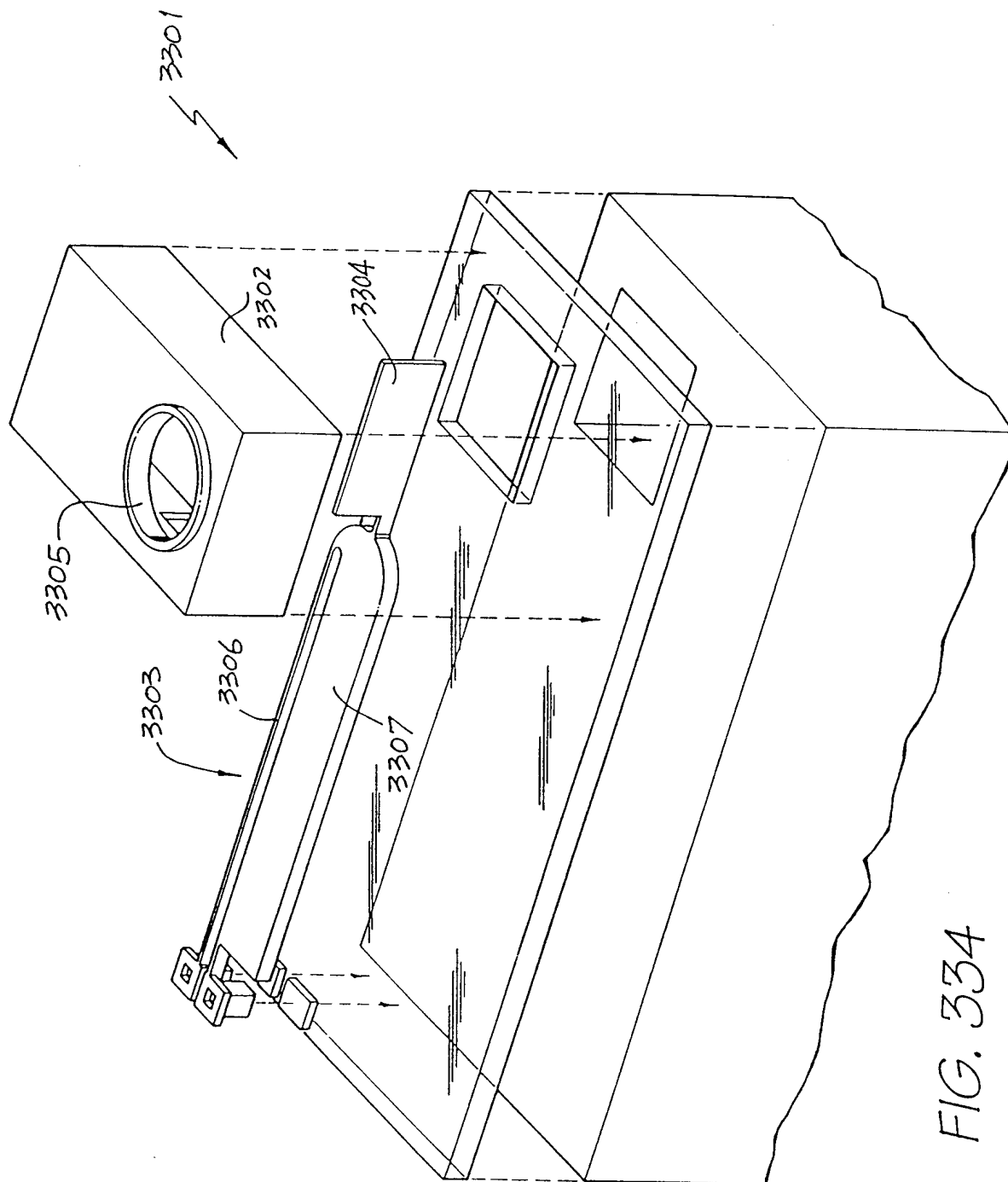


FIG. 332

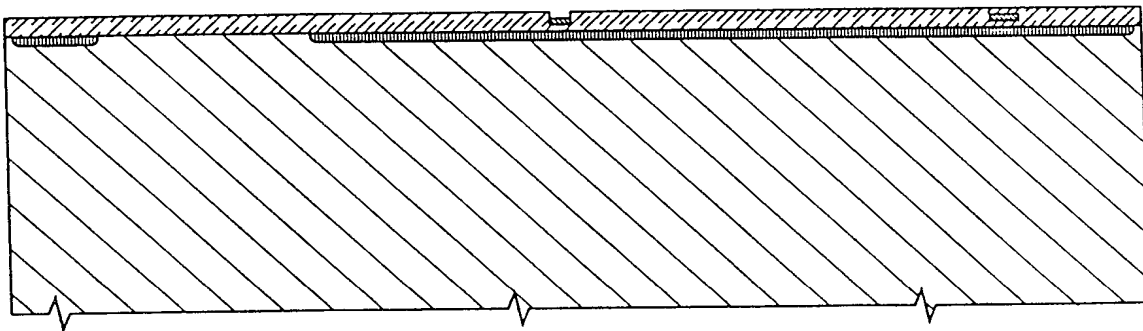
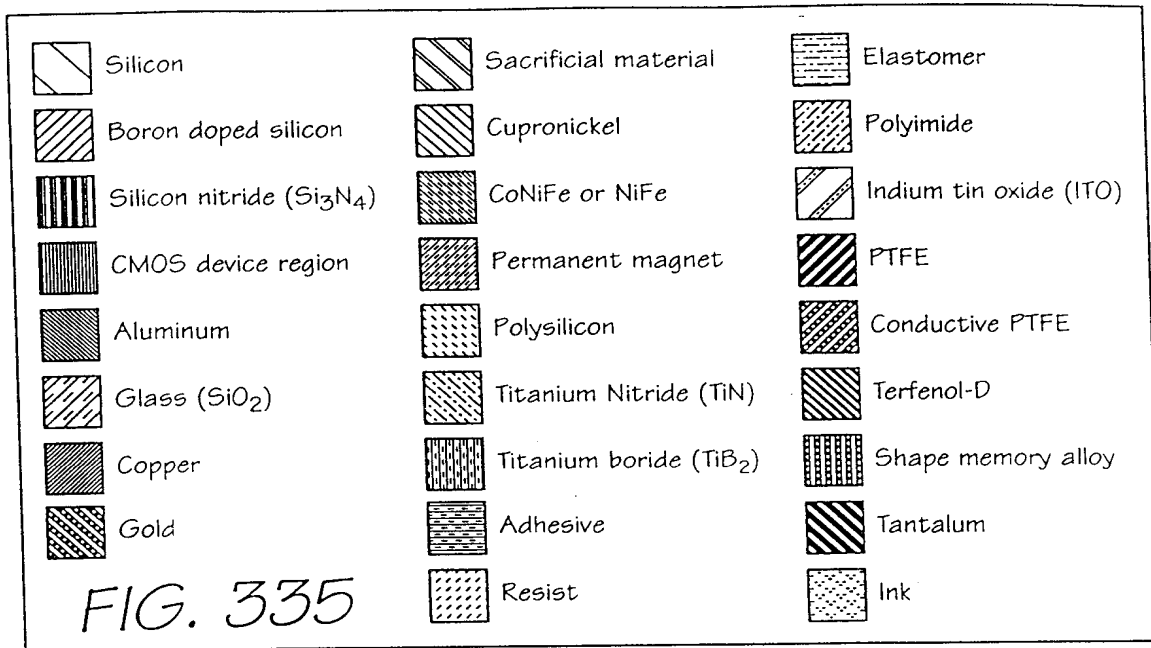
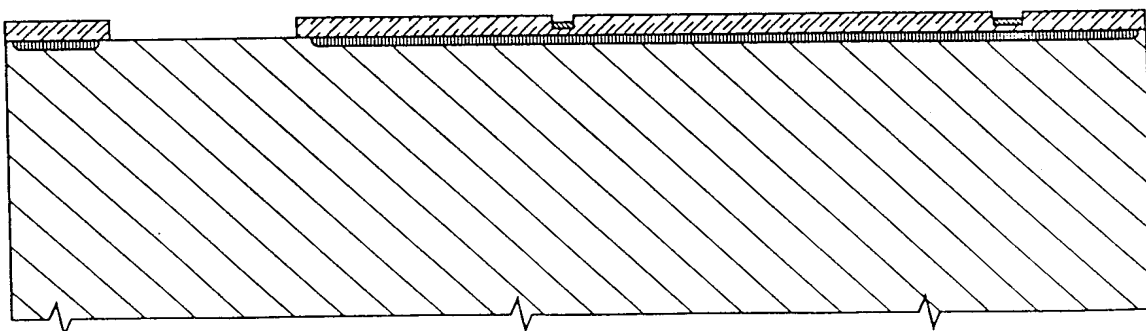
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*FIG. 336**FIG. 337*

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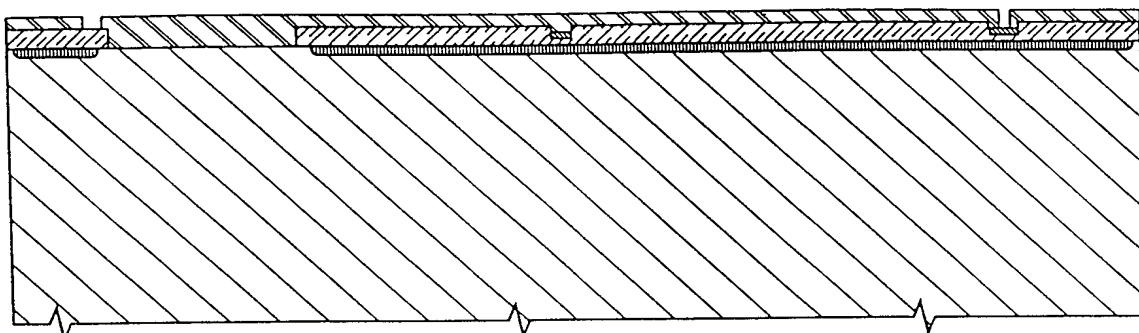


FIG. 338

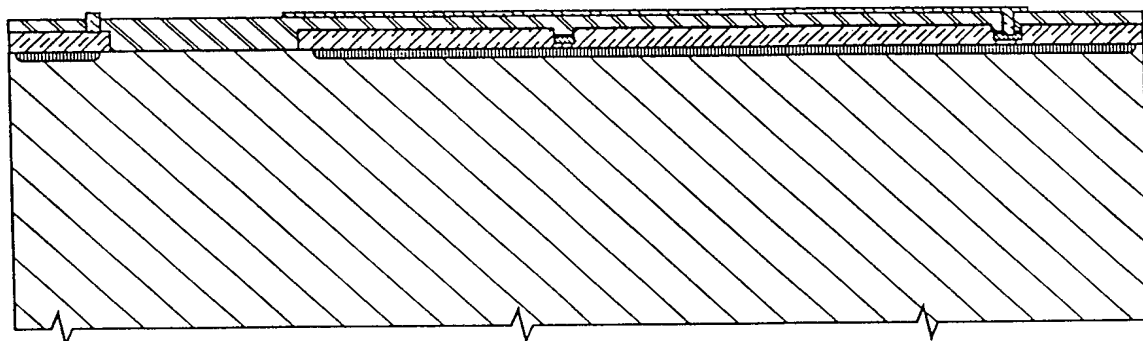


FIG. 339

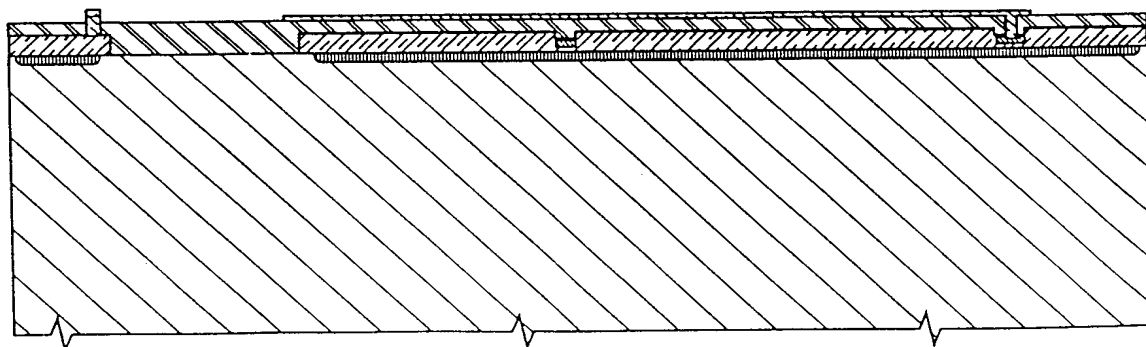


FIG. 340

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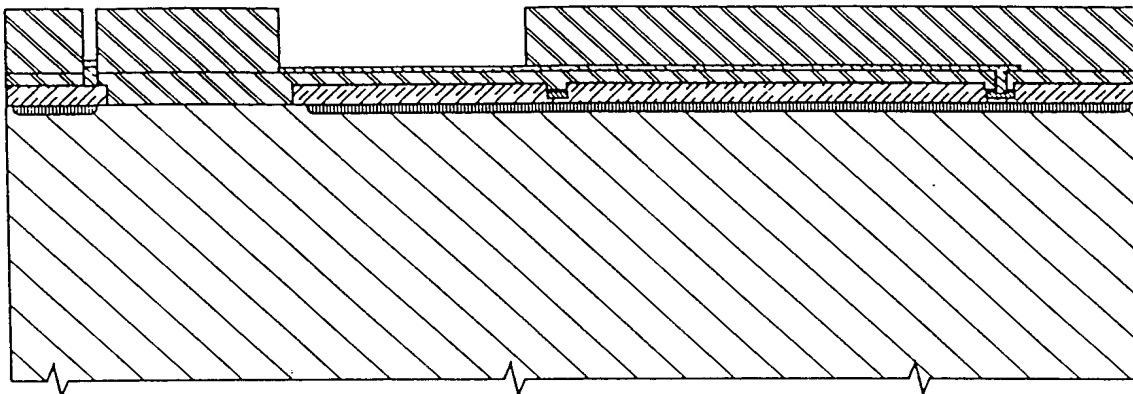


FIG. 341

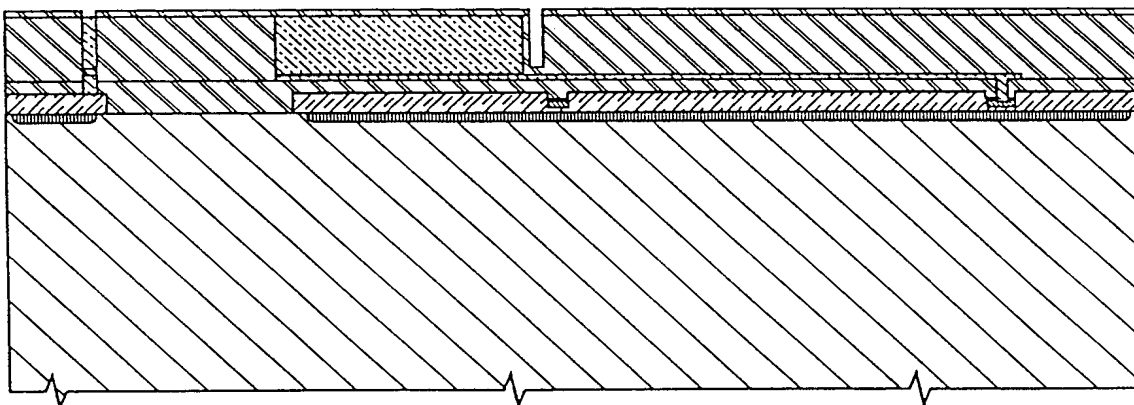


FIG. 342

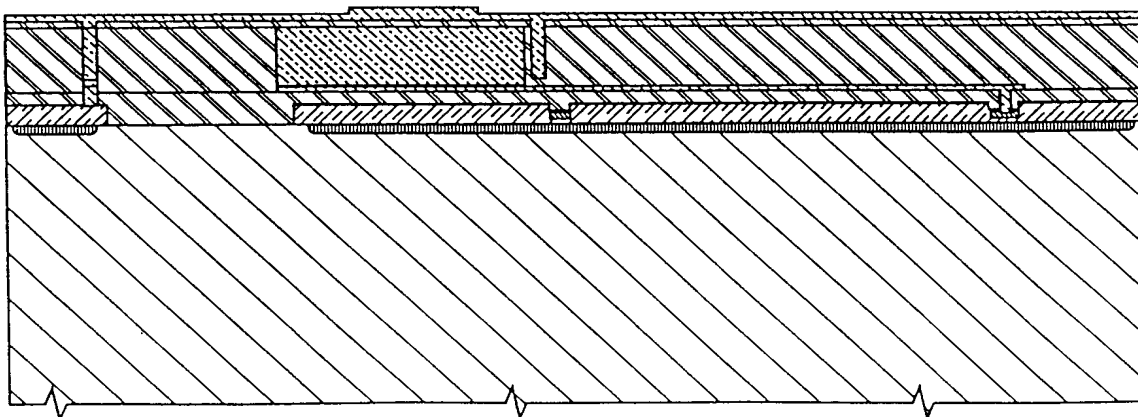


FIG. 343

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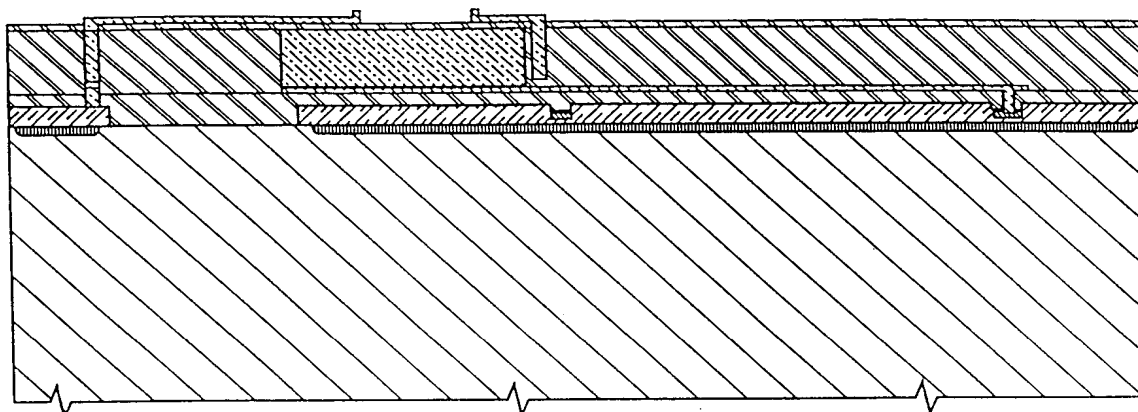


FIG. 344

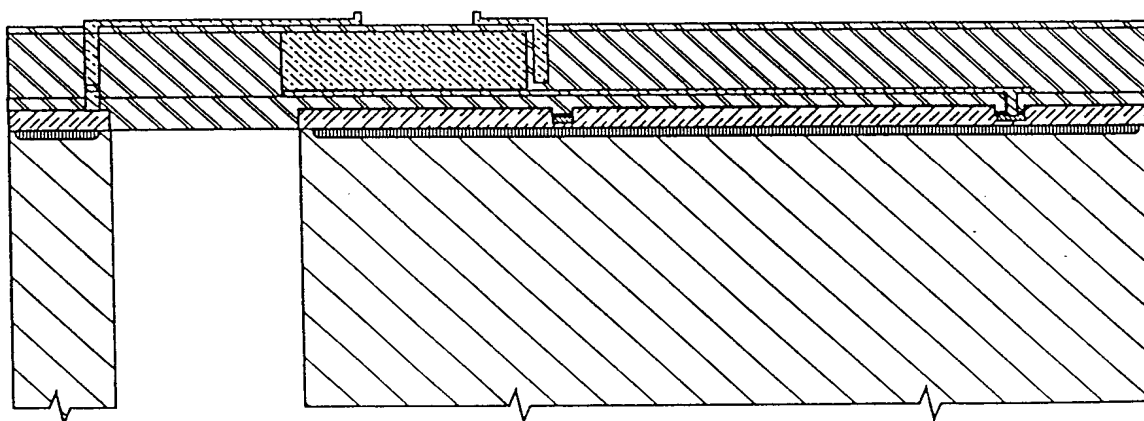


FIG. 345

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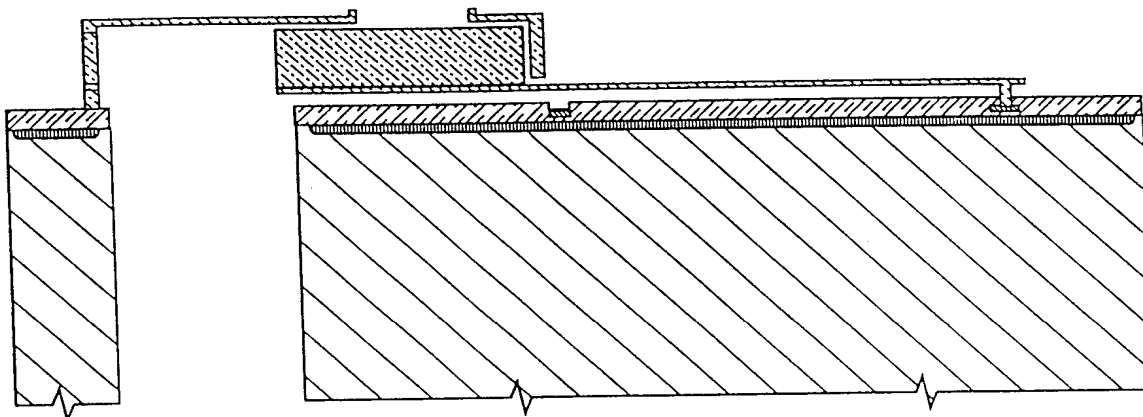


FIG. 346

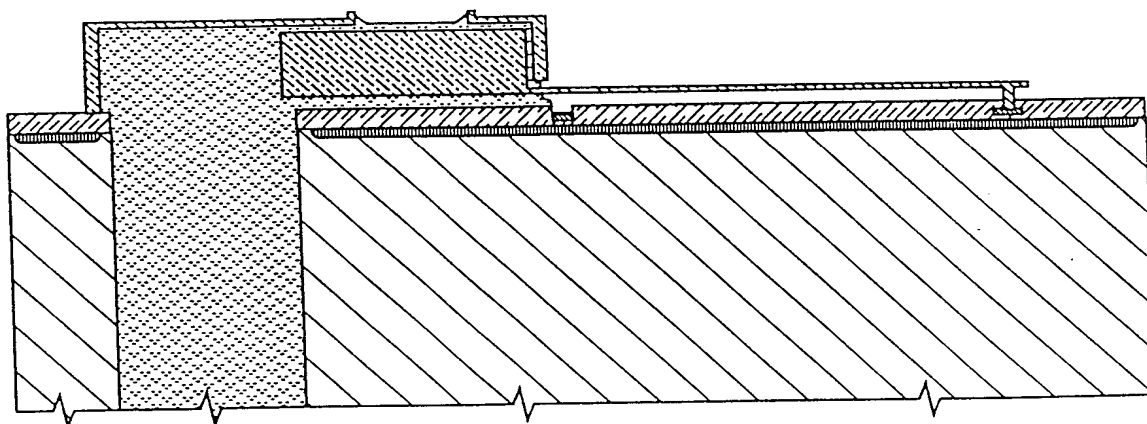
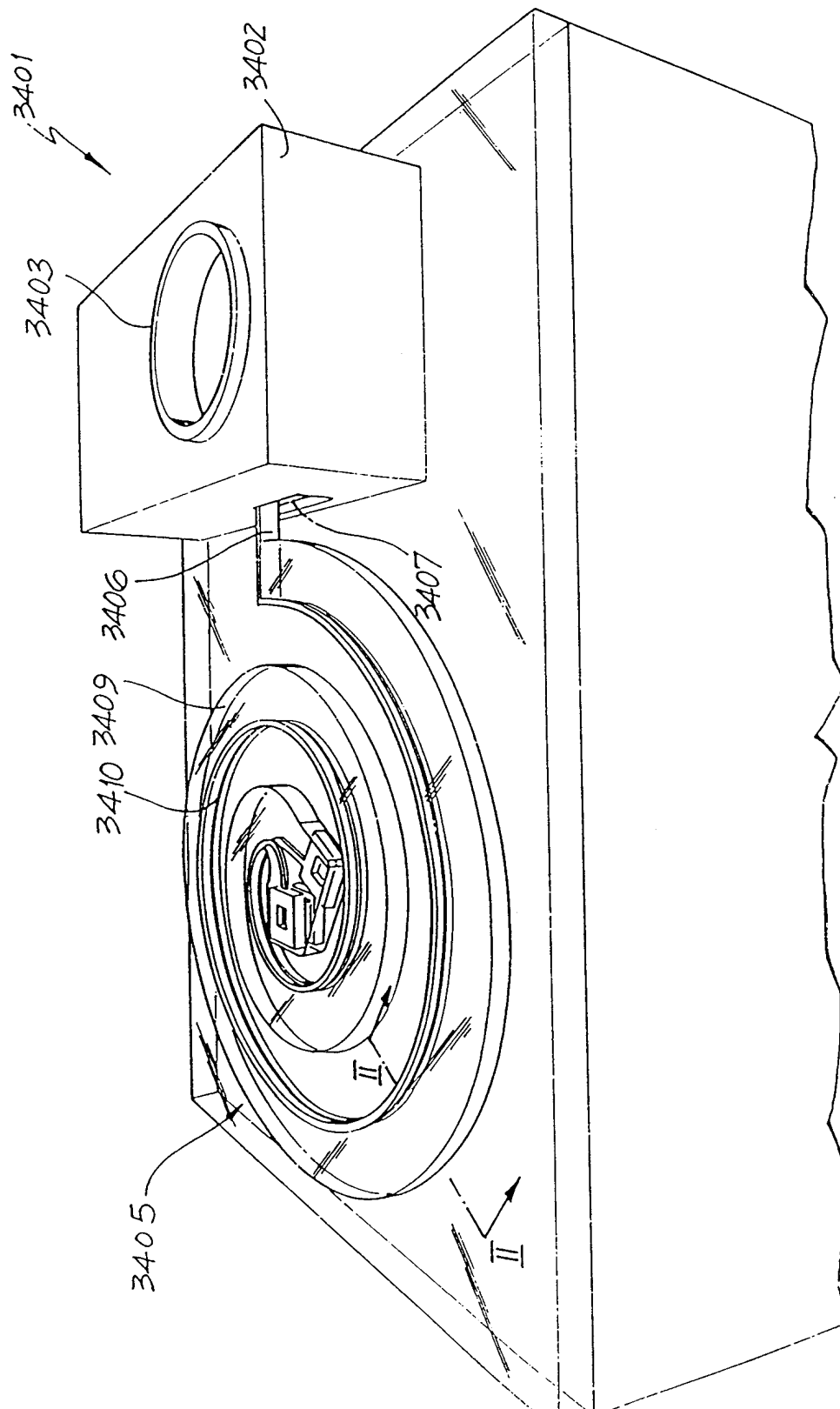


FIG. 347

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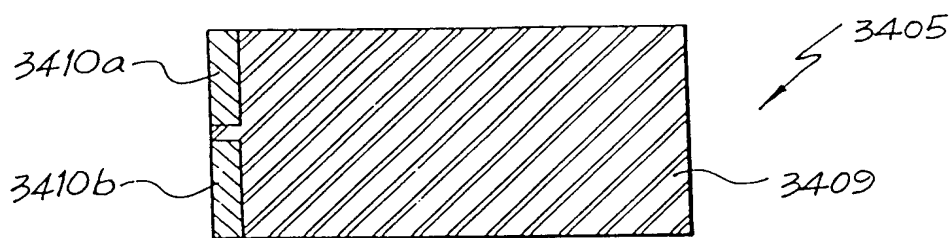


FIG. 349

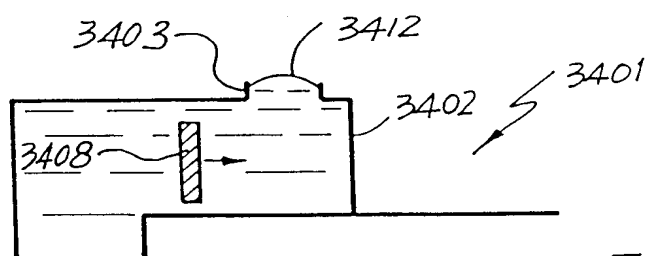


FIG. 350

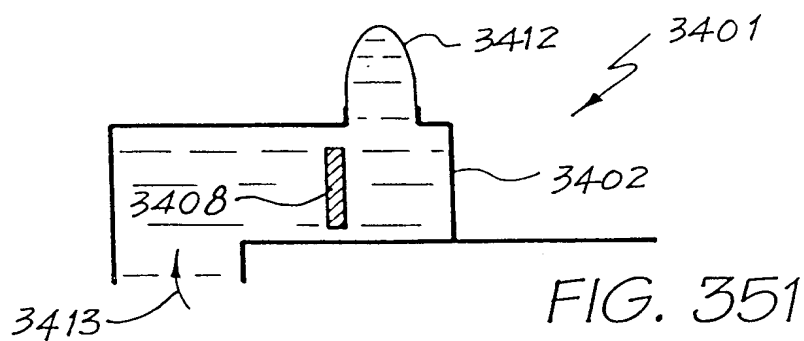


FIG. 351

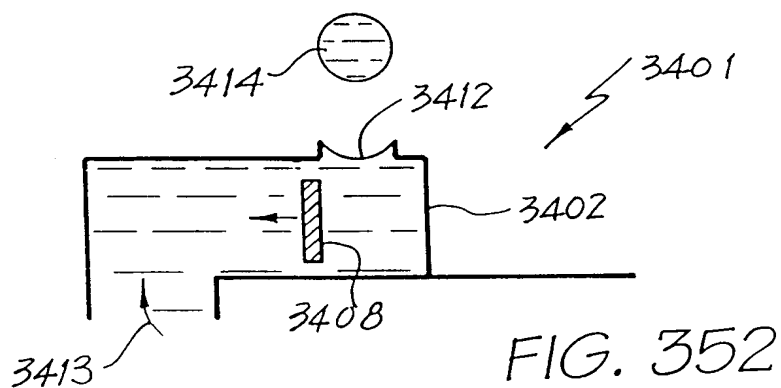


FIG. 352

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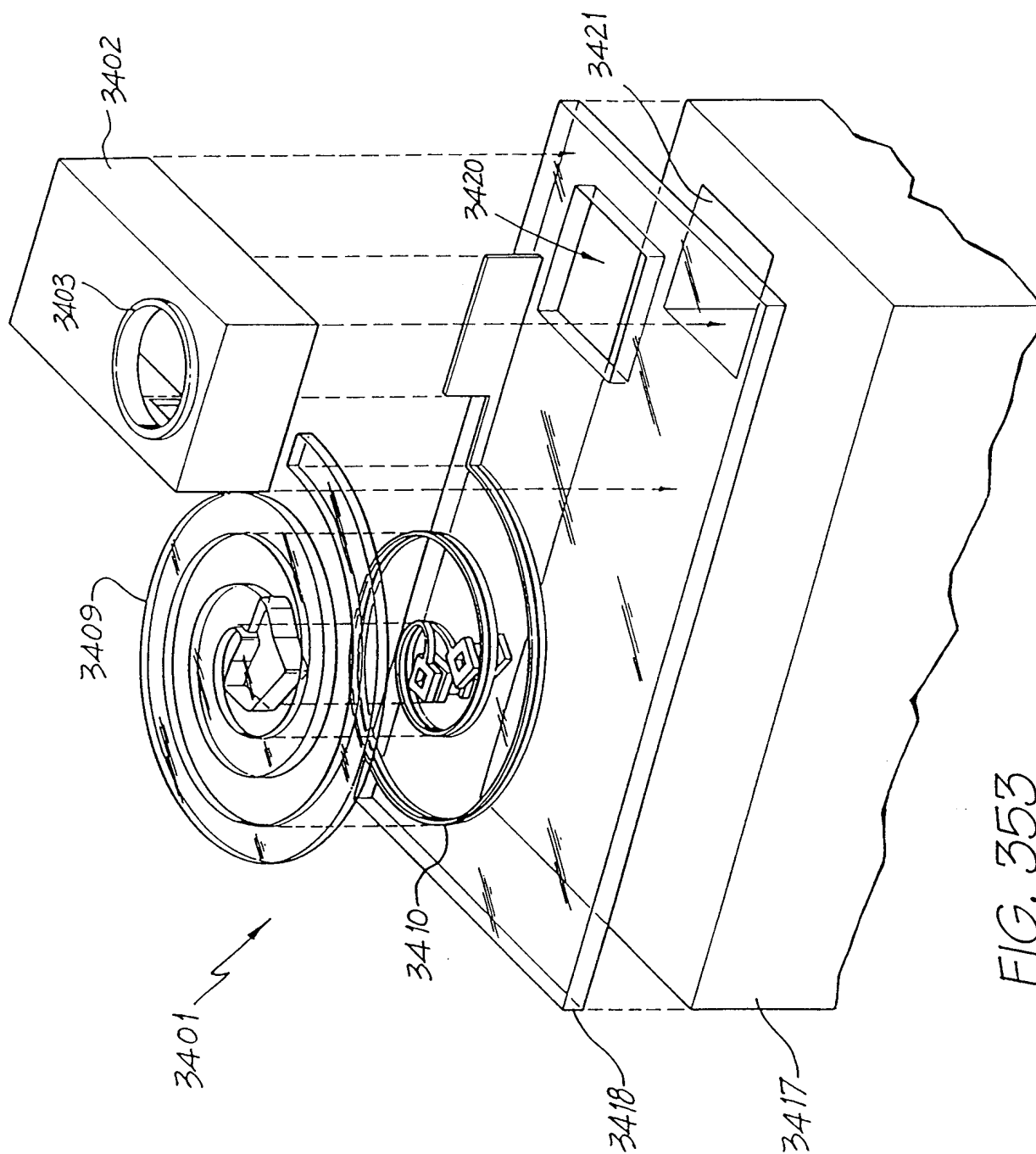
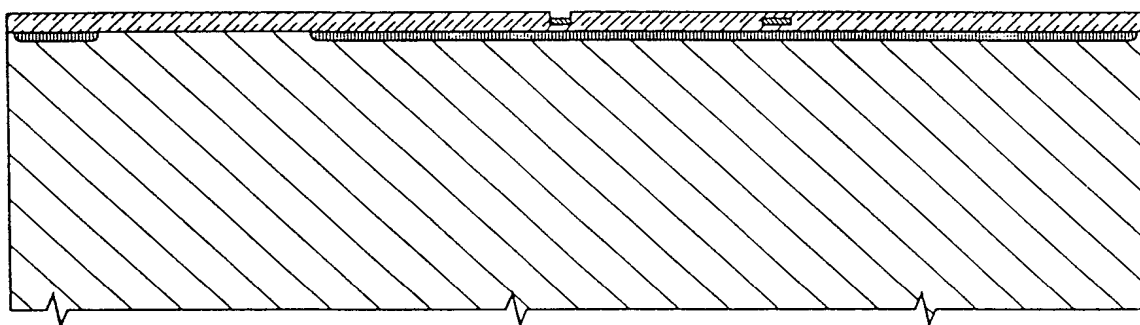
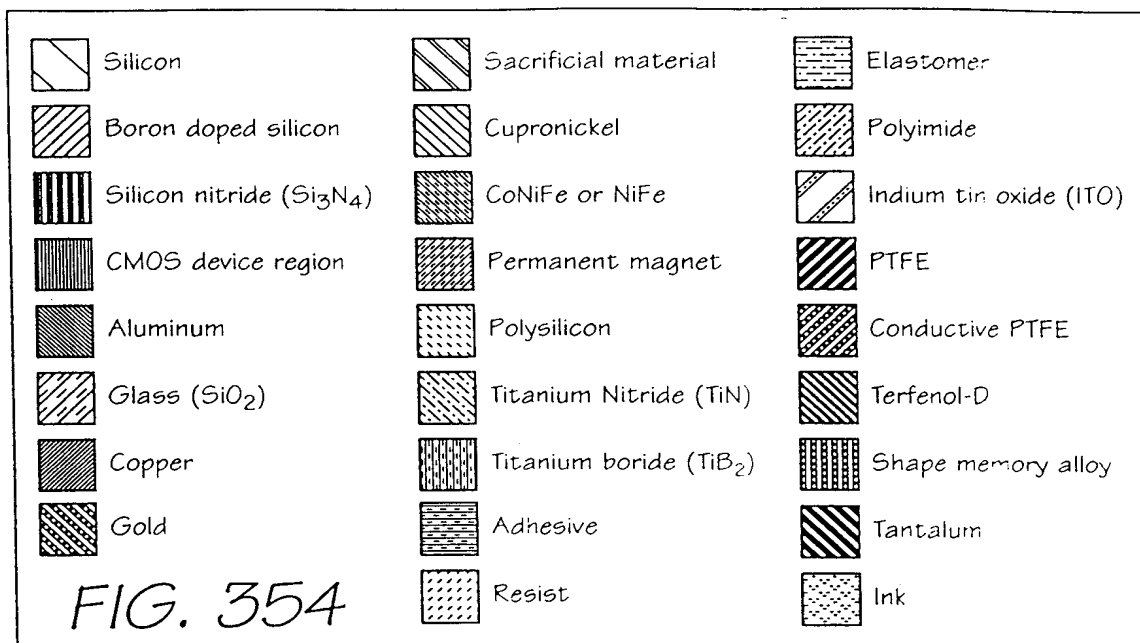
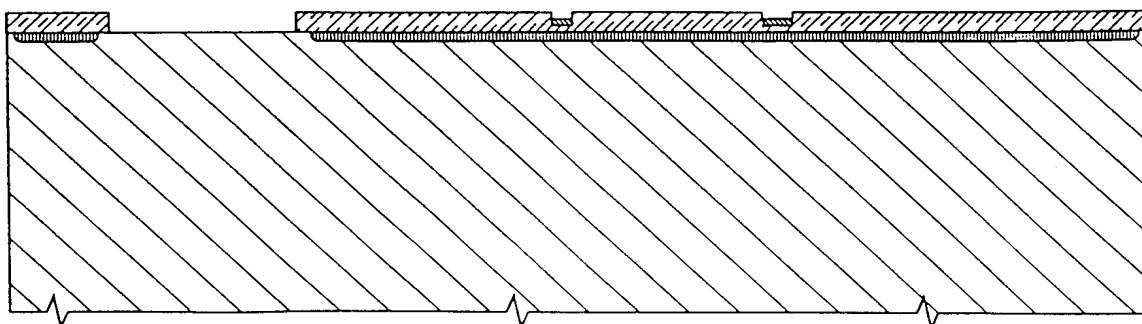


FIG. 353

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*FIG. 355**FIG. 356*

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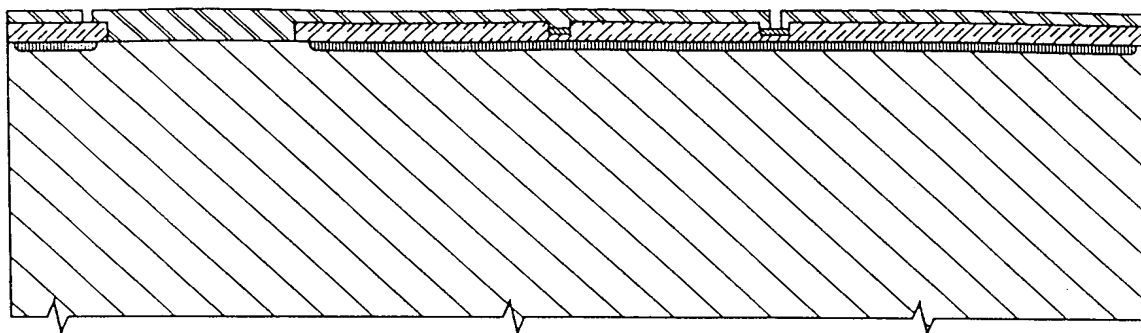


FIG. 357

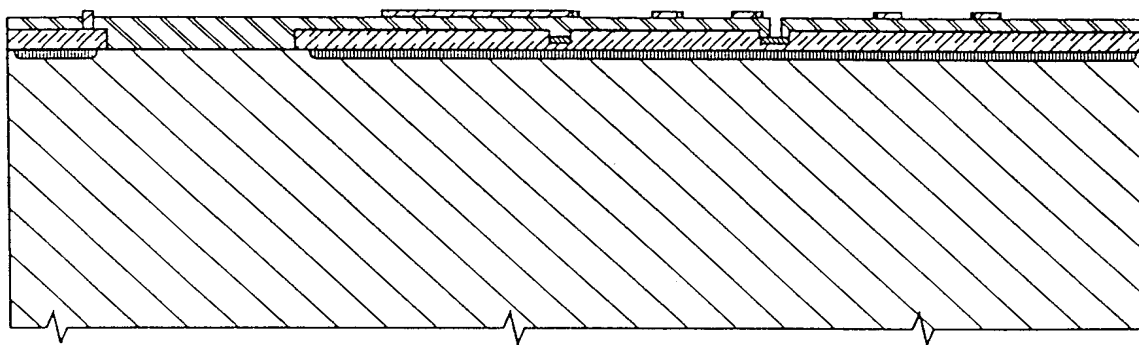


FIG. 358

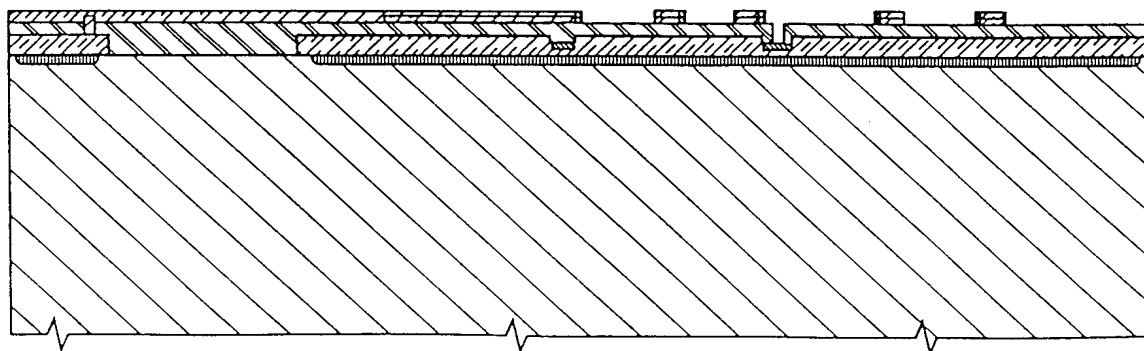


FIG. 359

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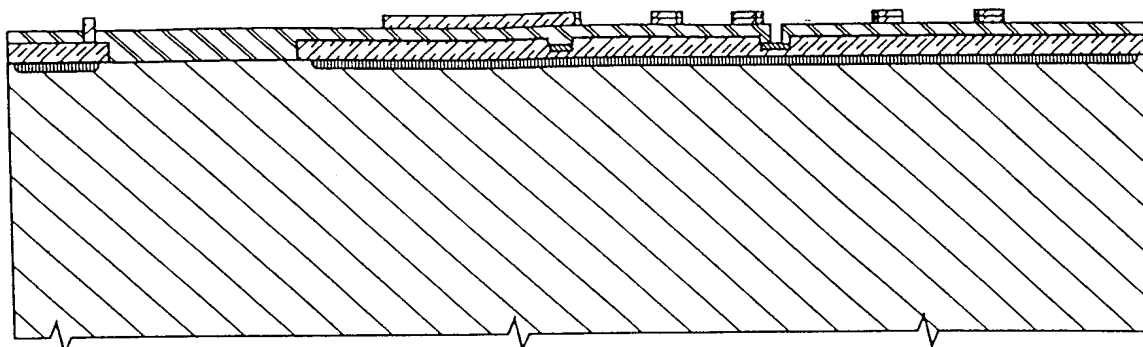


FIG. 360

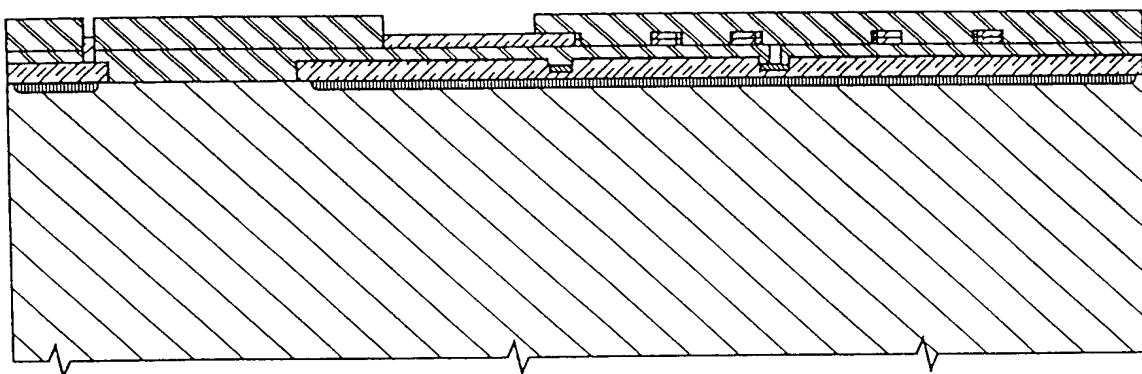


FIG. 361

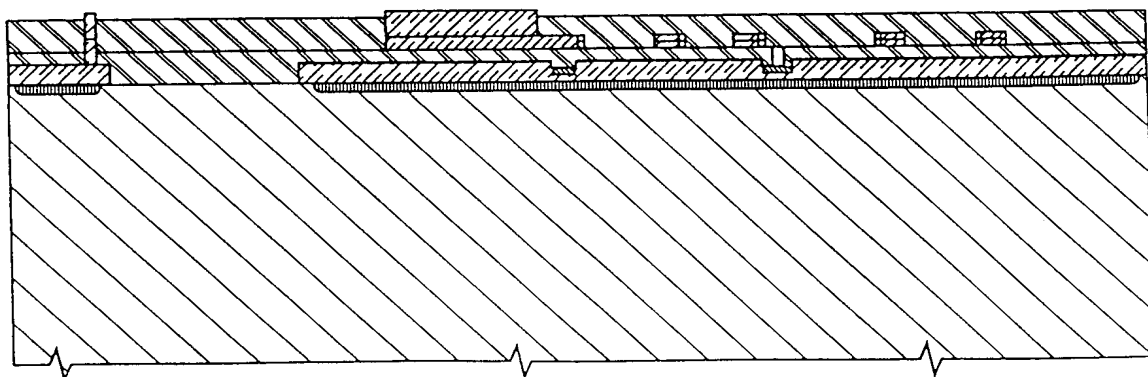


FIG. 362

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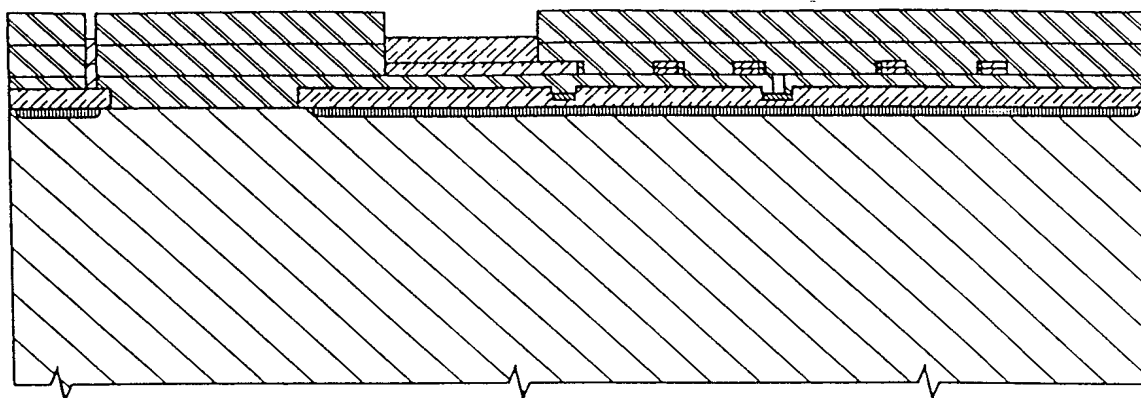


FIG. 363

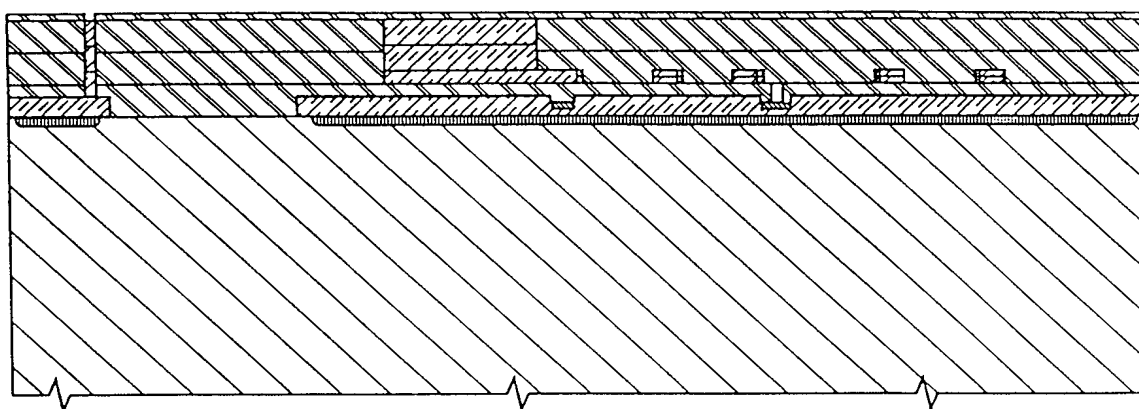


FIG. 364

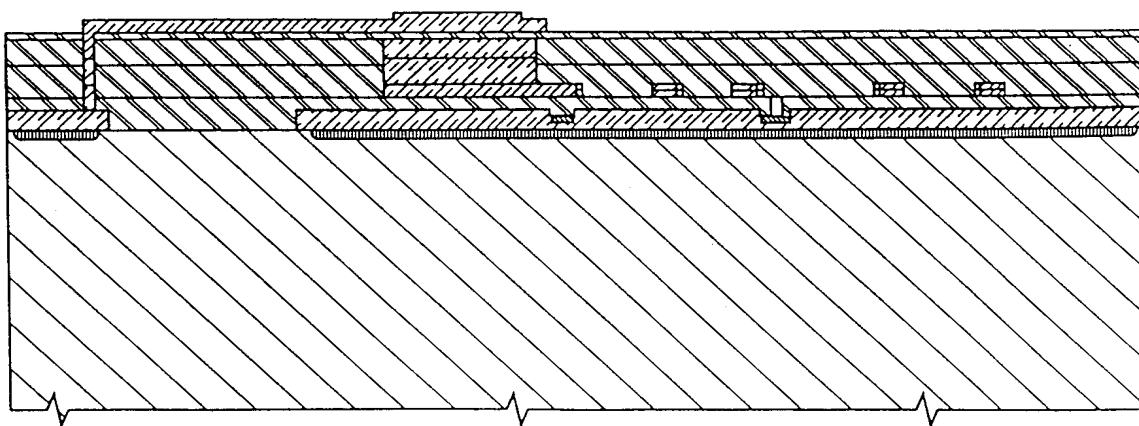


FIG. 365

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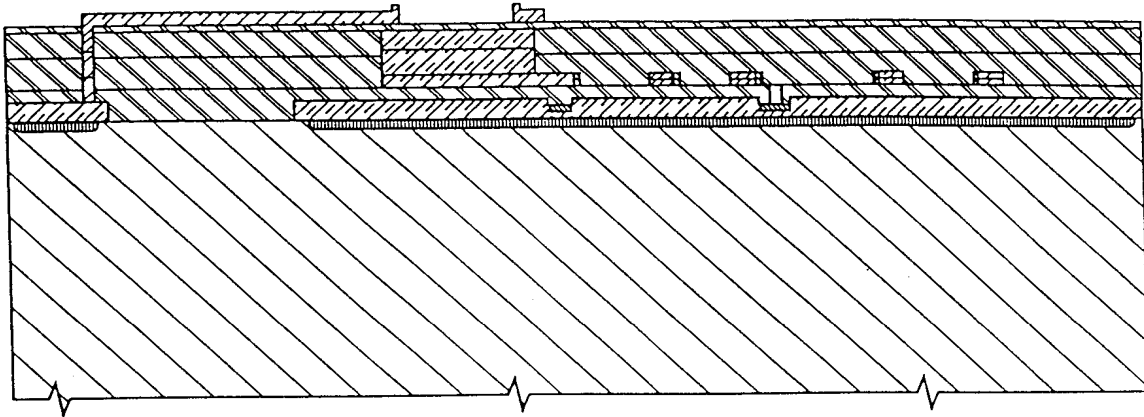


FIG. 366

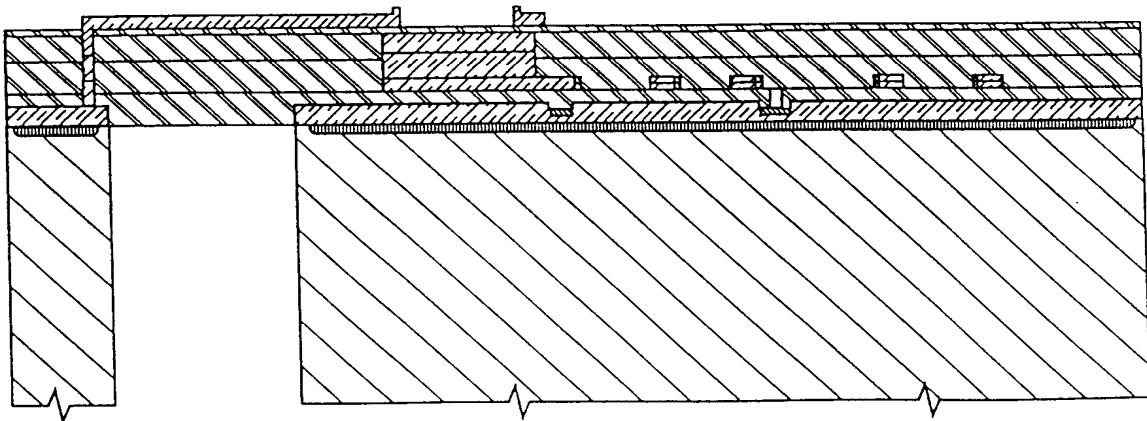


FIG. 367

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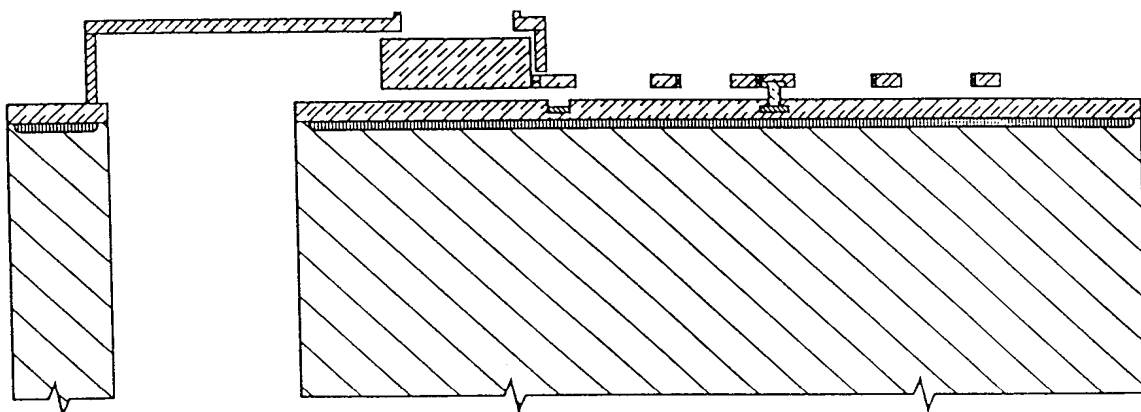


FIG. 368

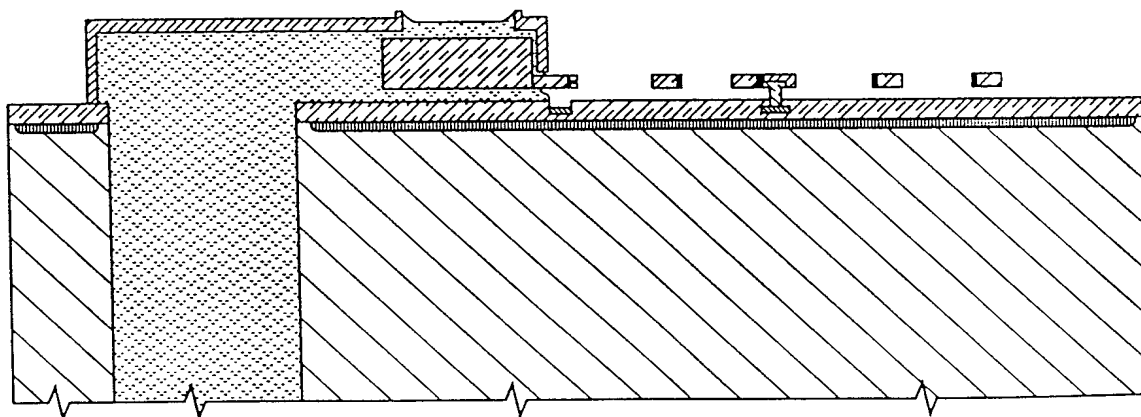


FIG. 369

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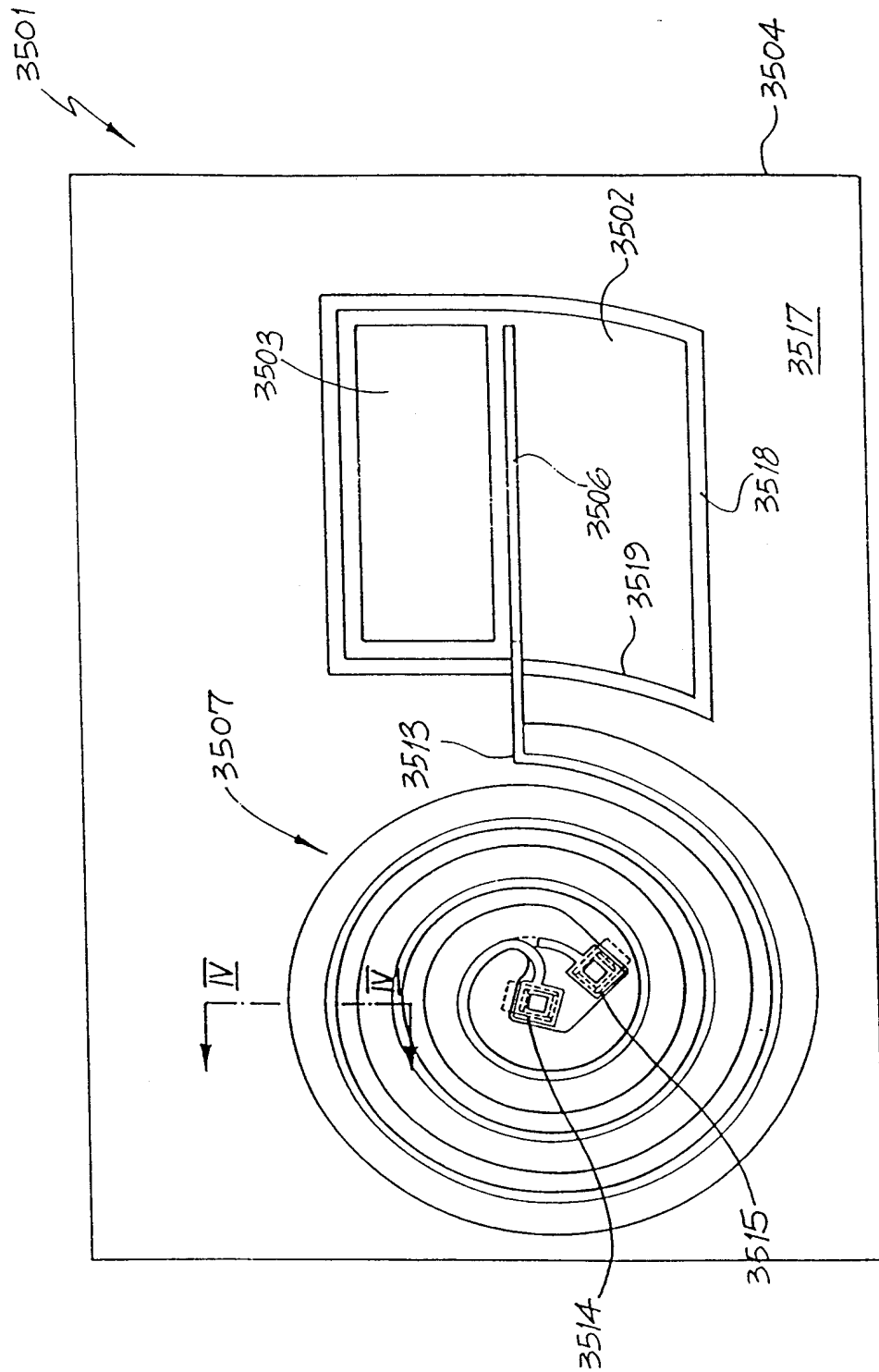


FIG. 370

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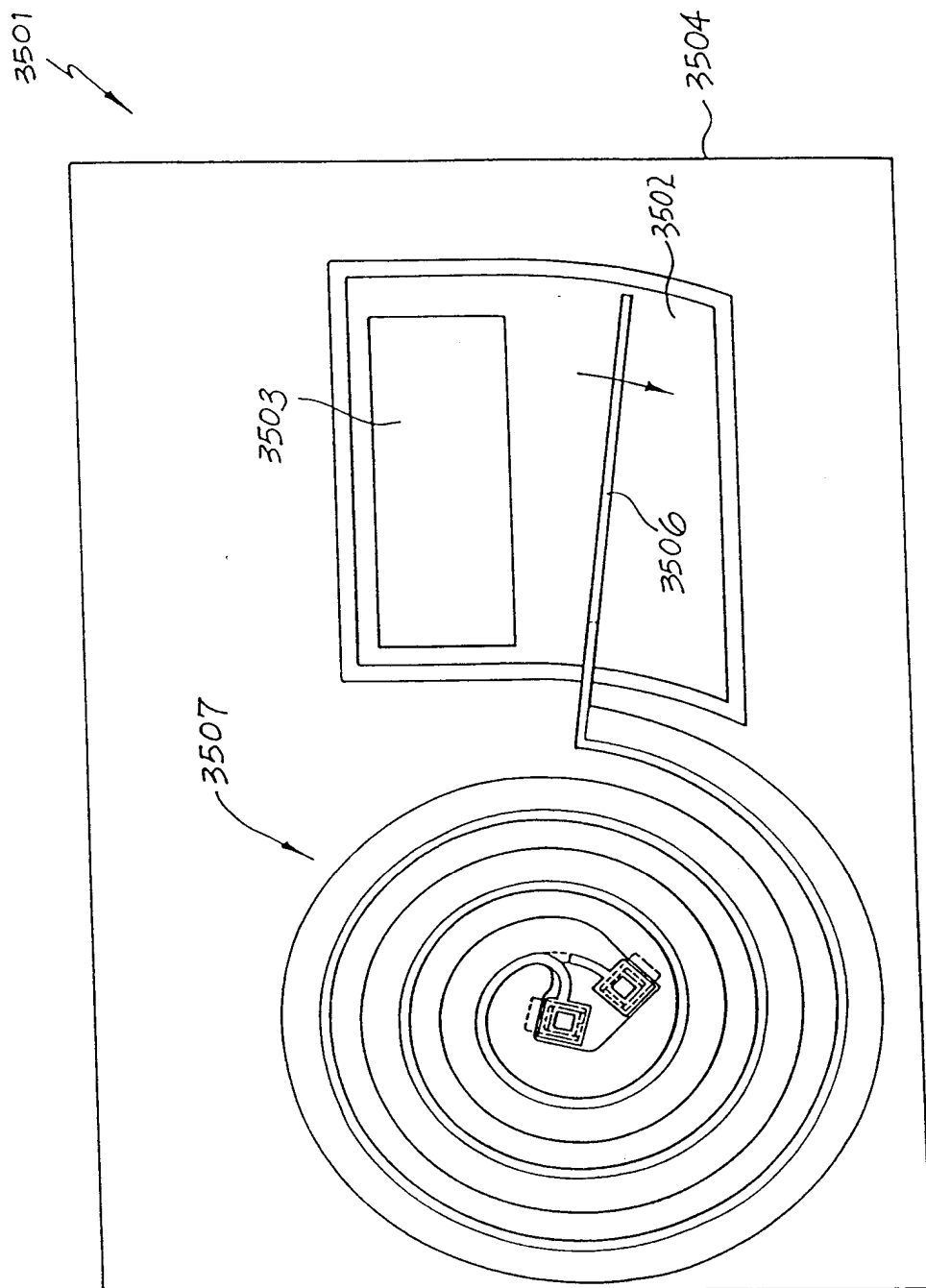


FIG. 371

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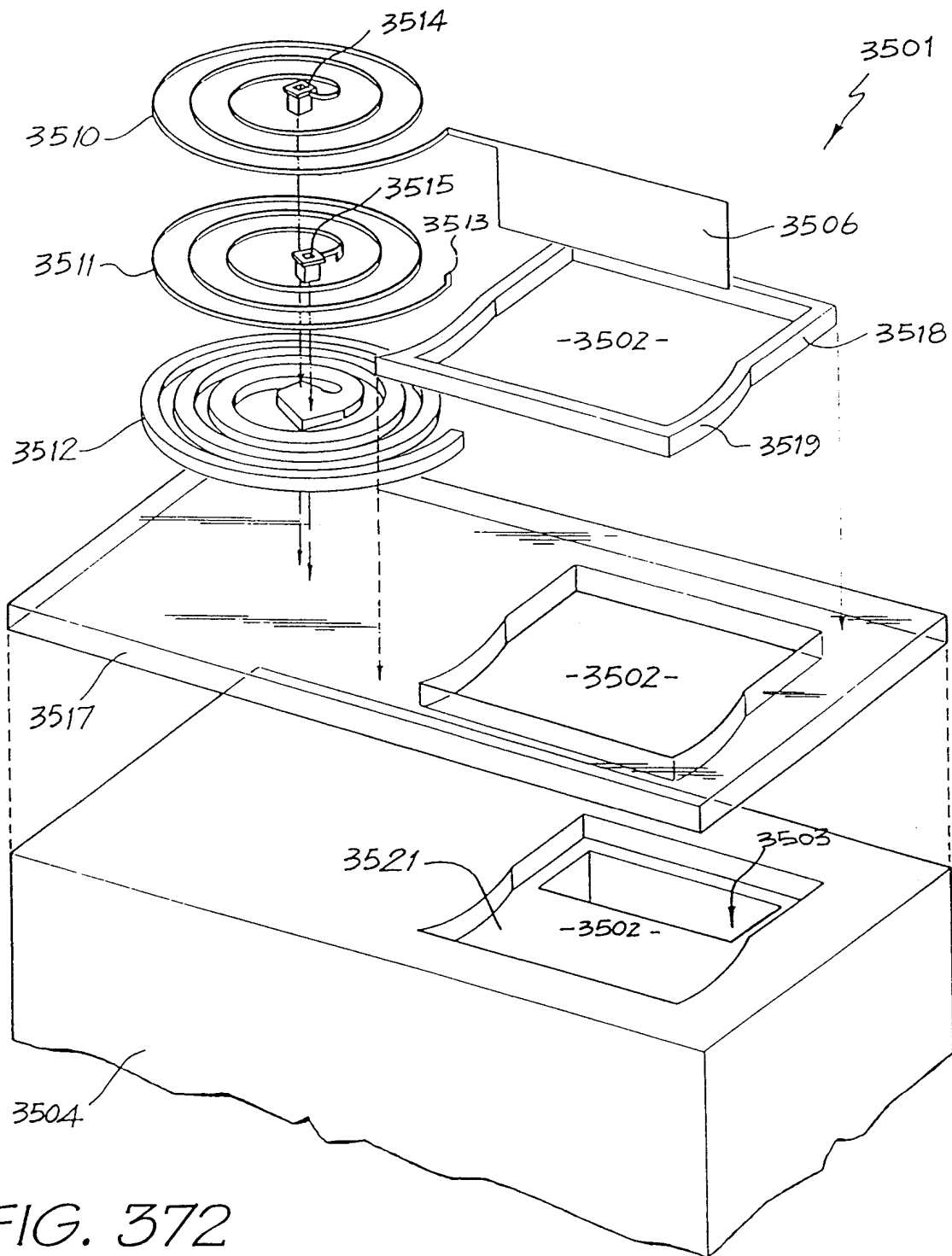


FIG. 372

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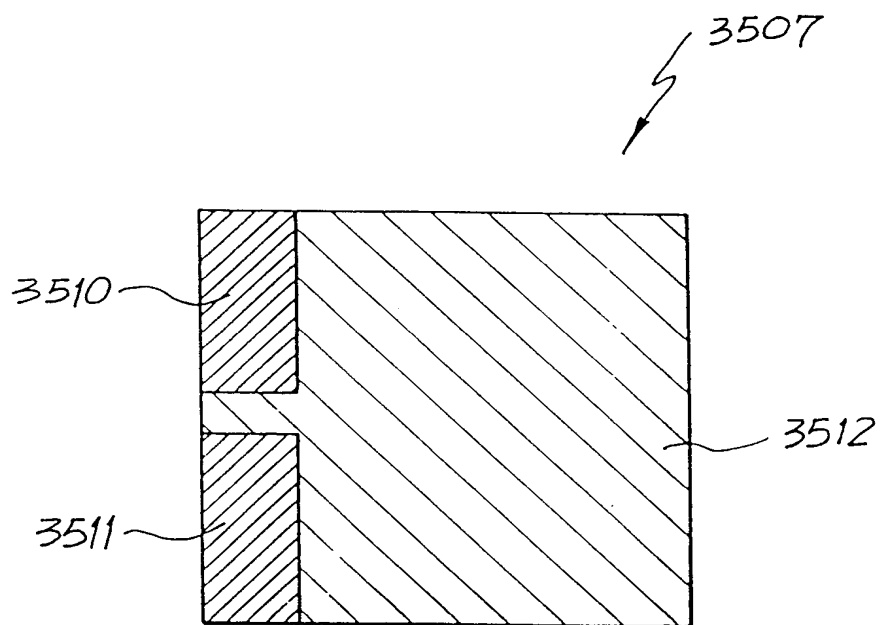
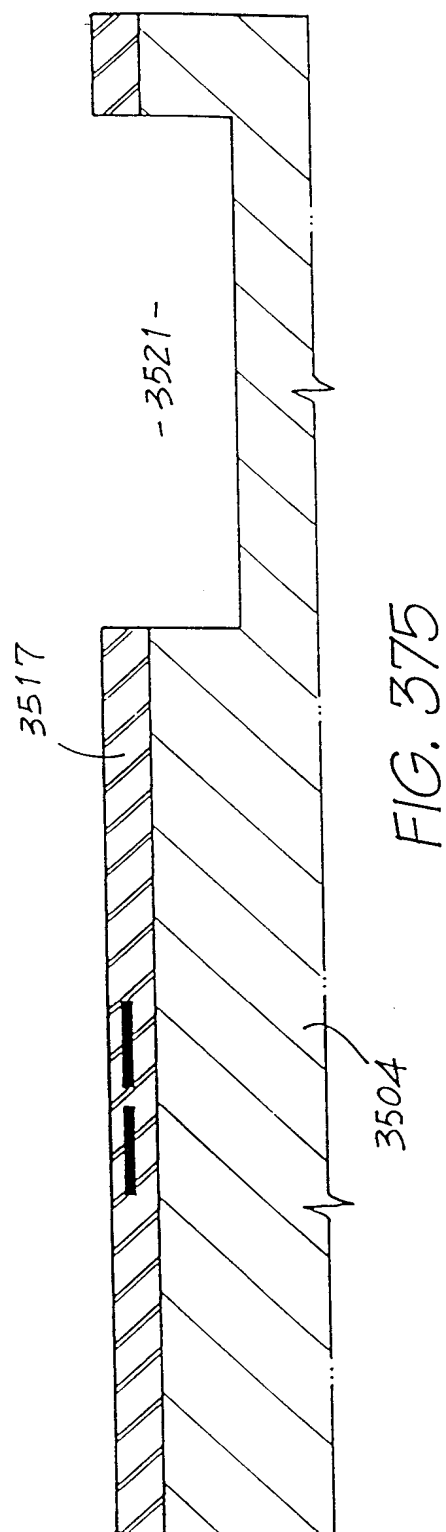
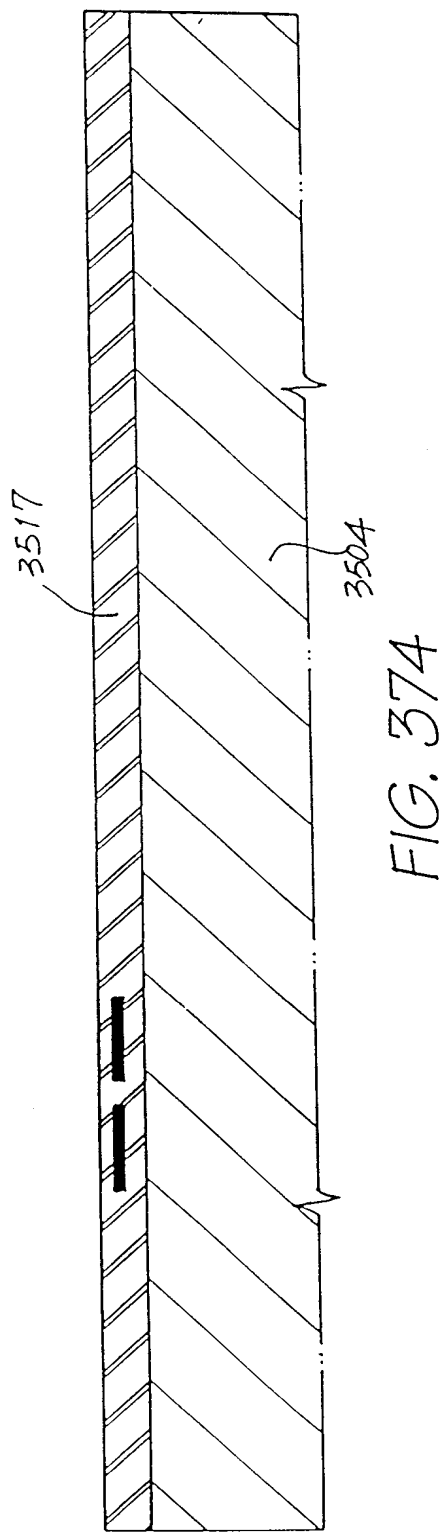
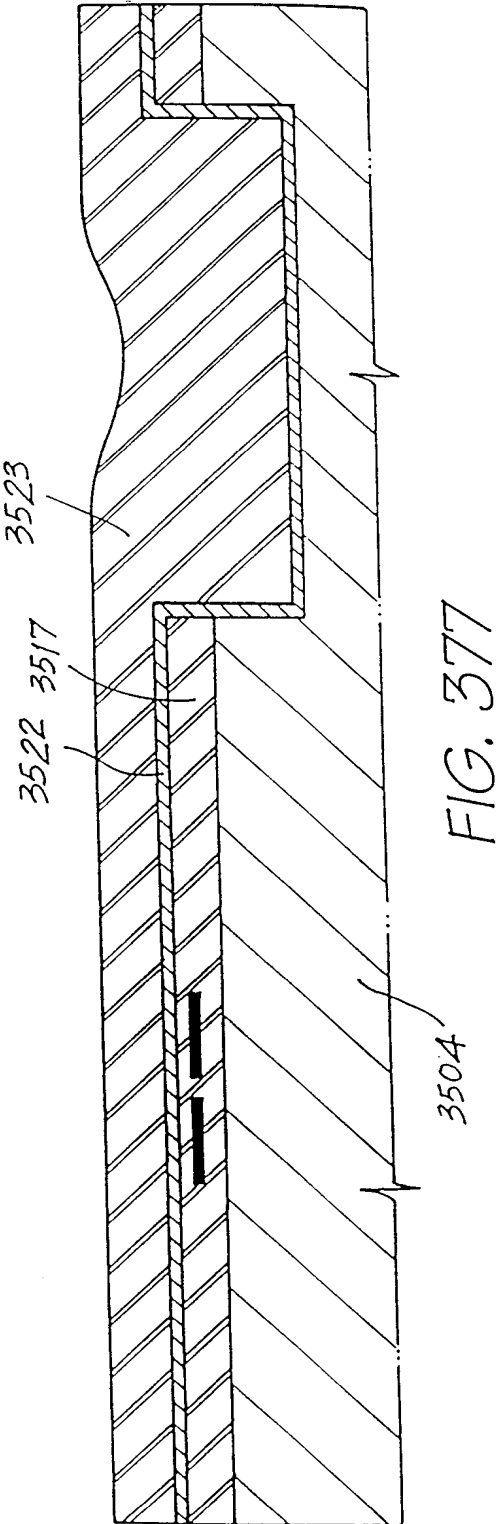
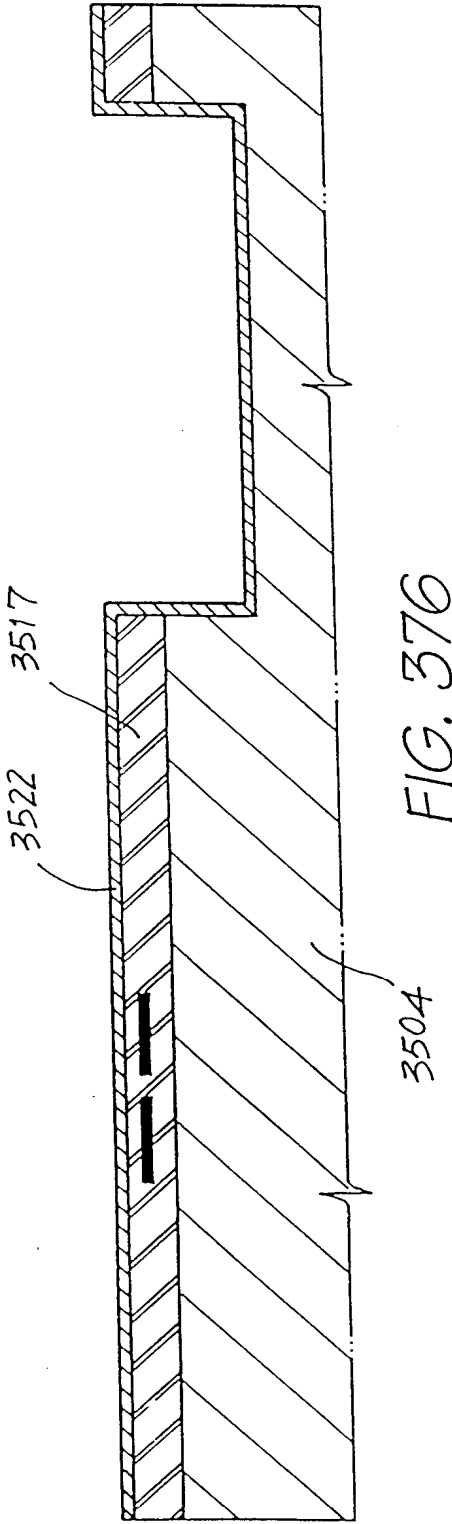


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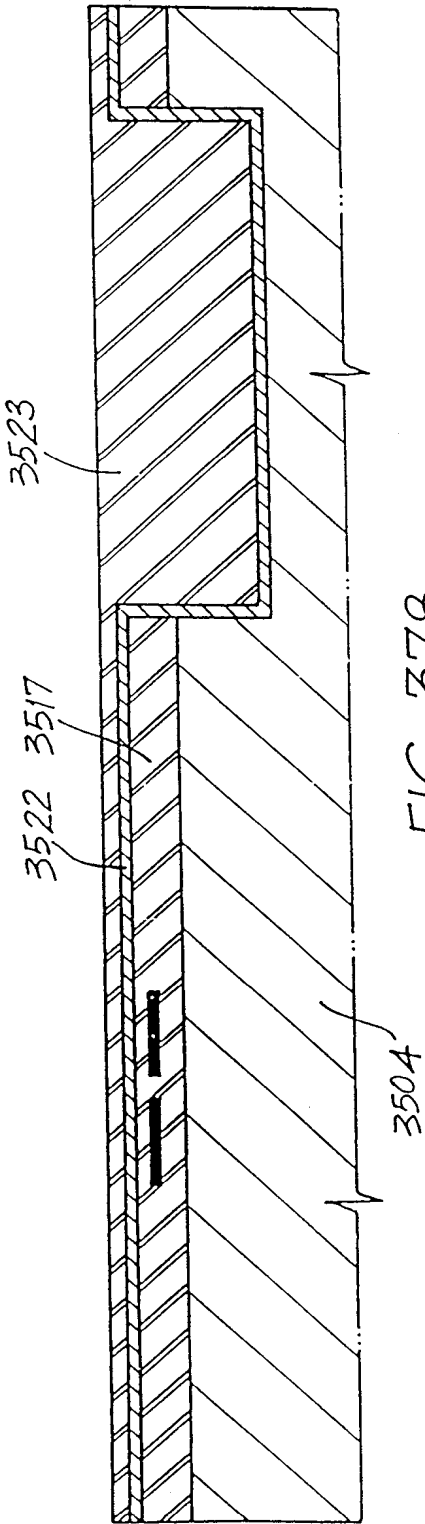


FIG. 378

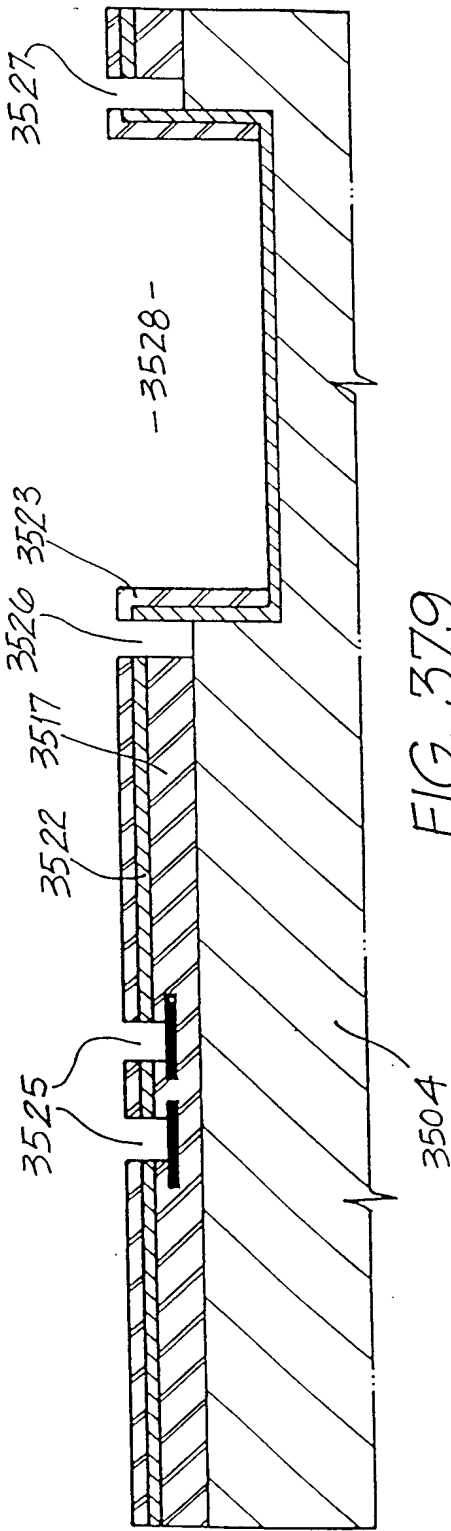
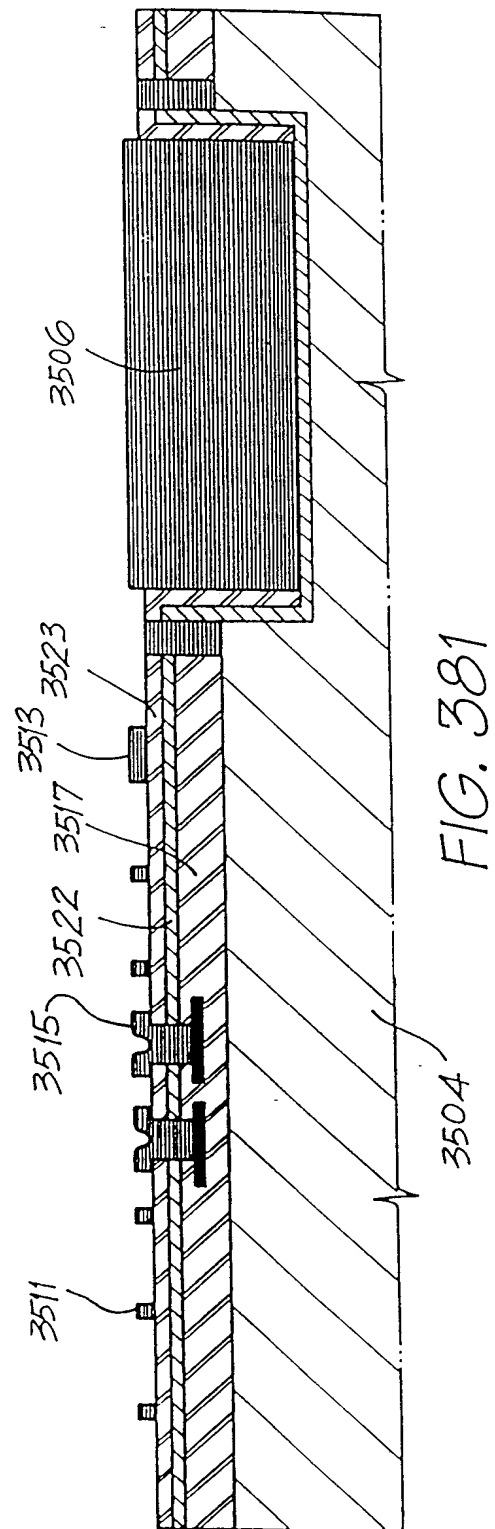
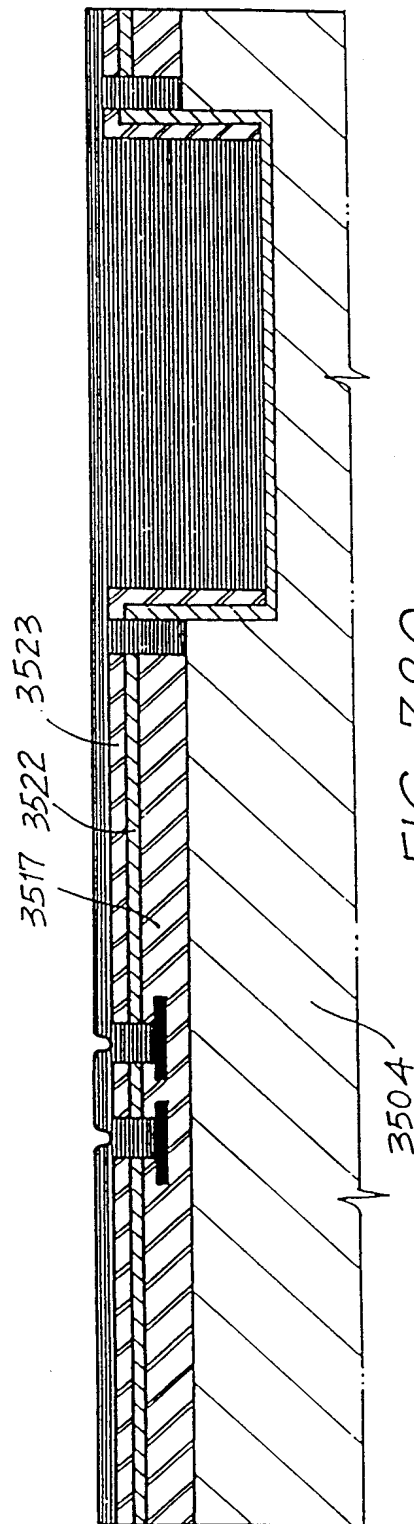
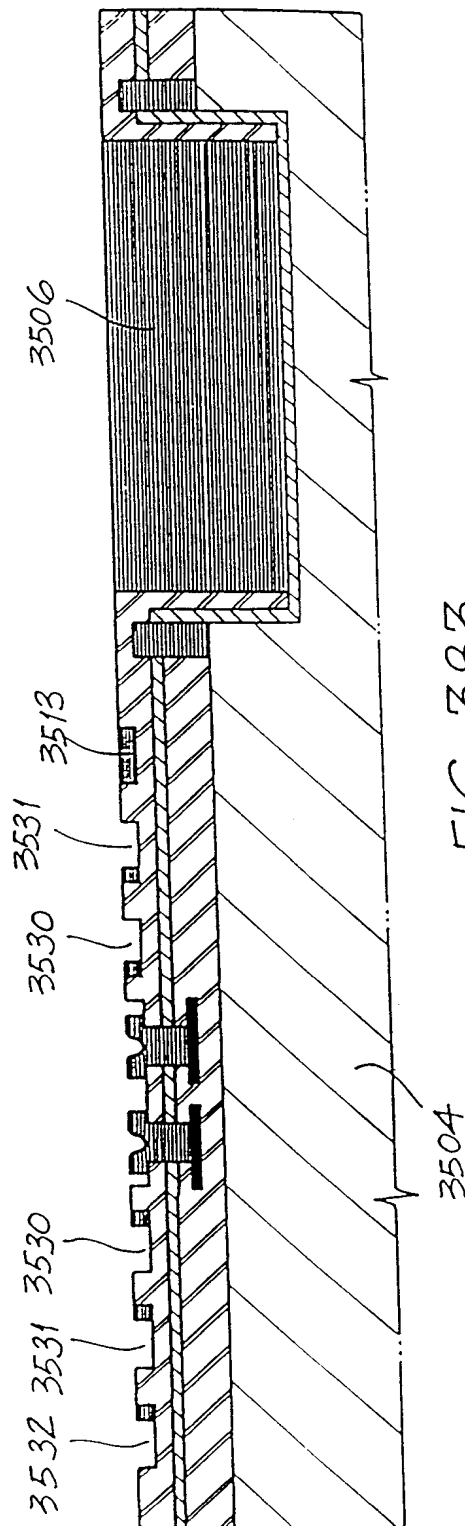
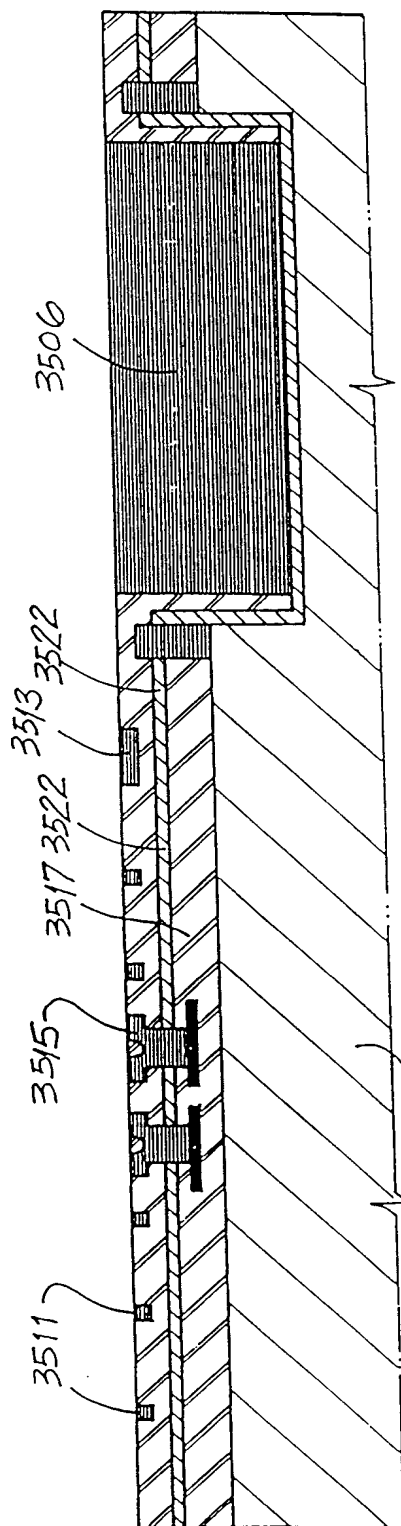


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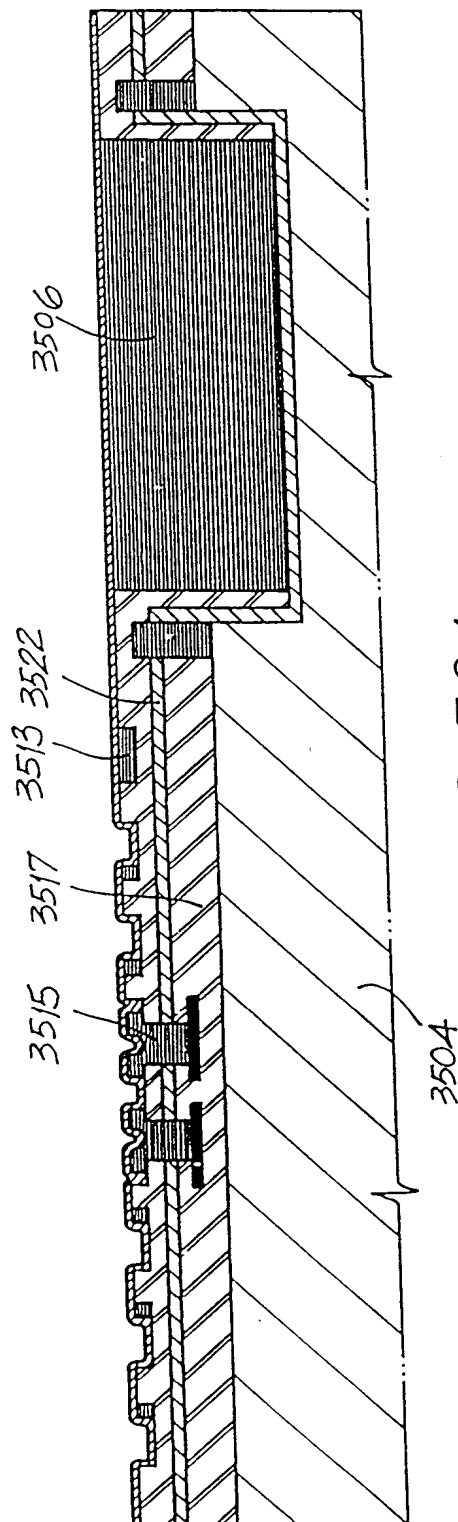


FIG. 384

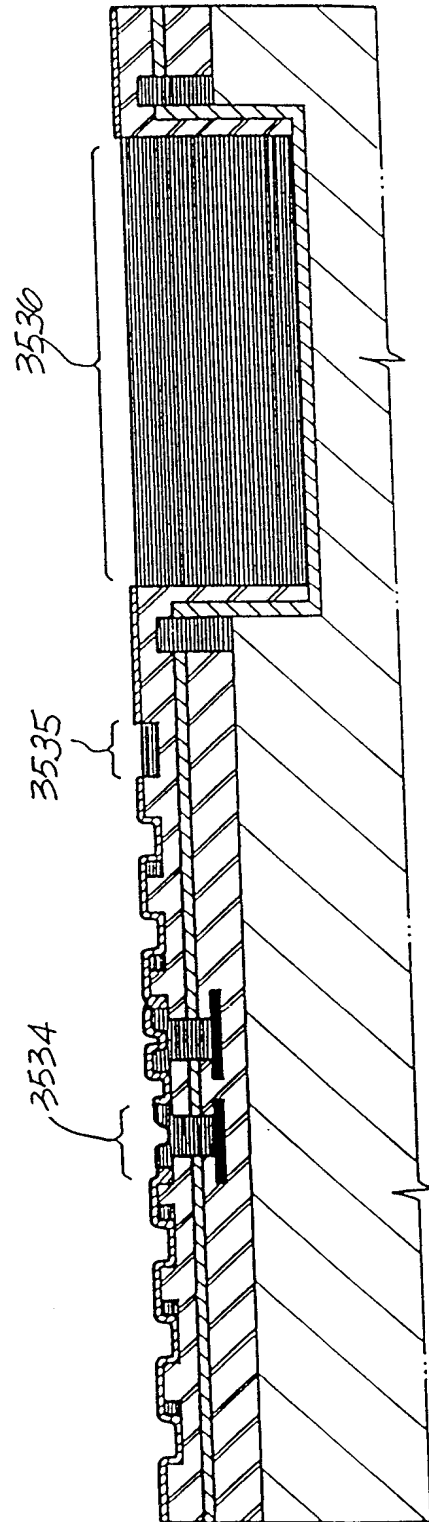


FIG. 385

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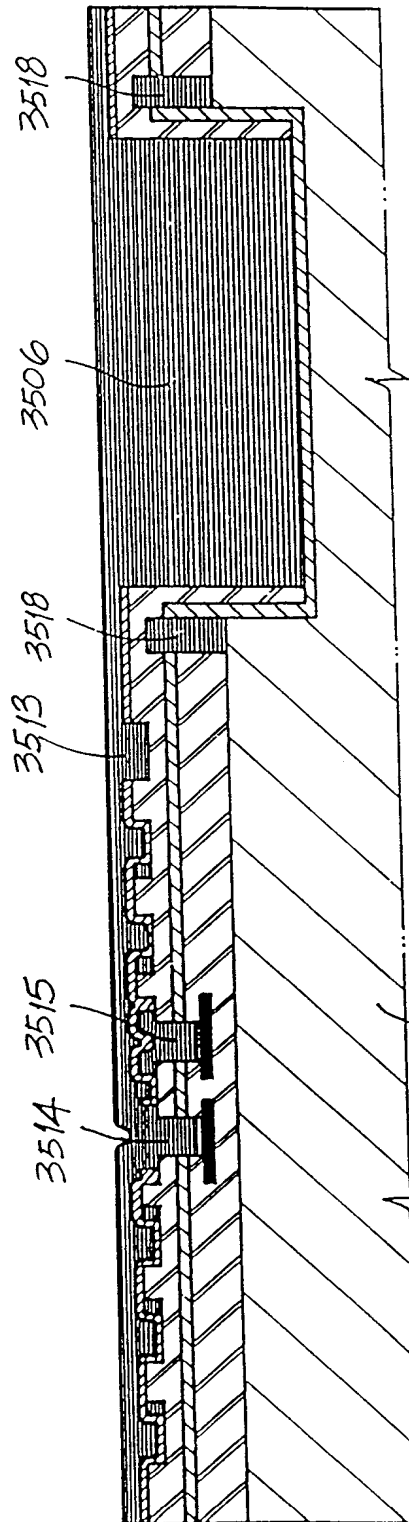


FIG. 386

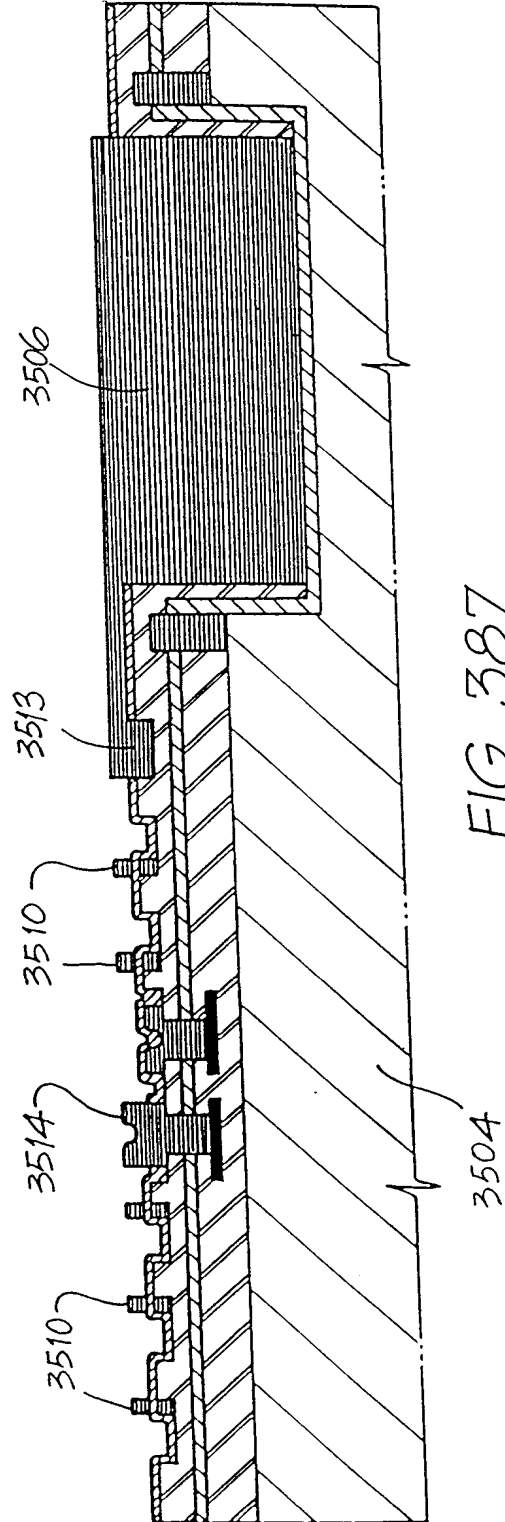


FIG. 387

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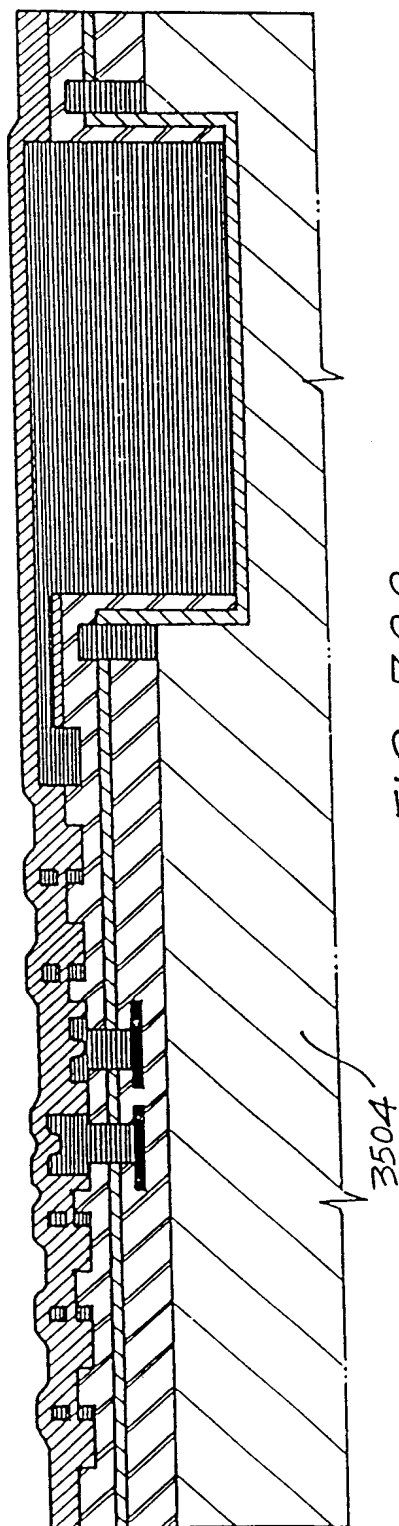


FIG. 388

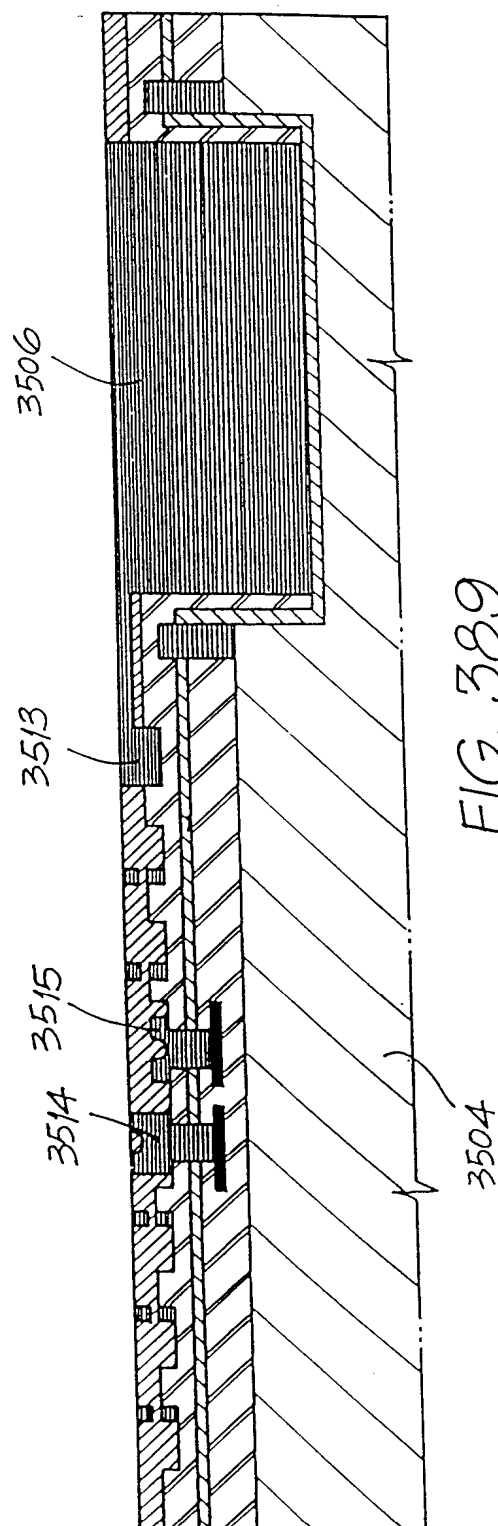
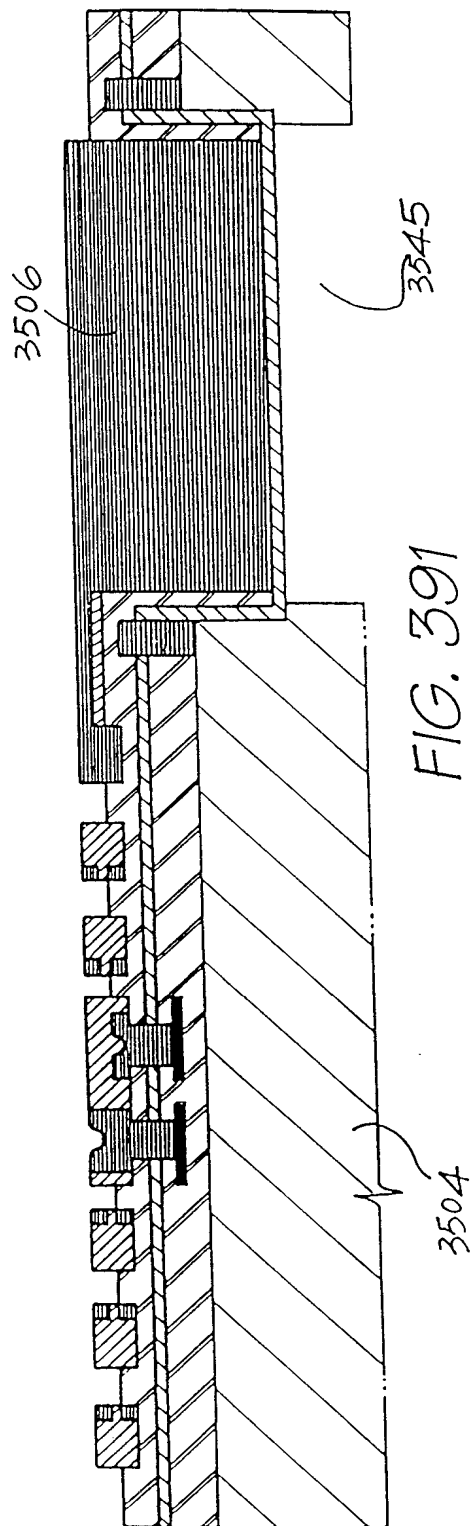
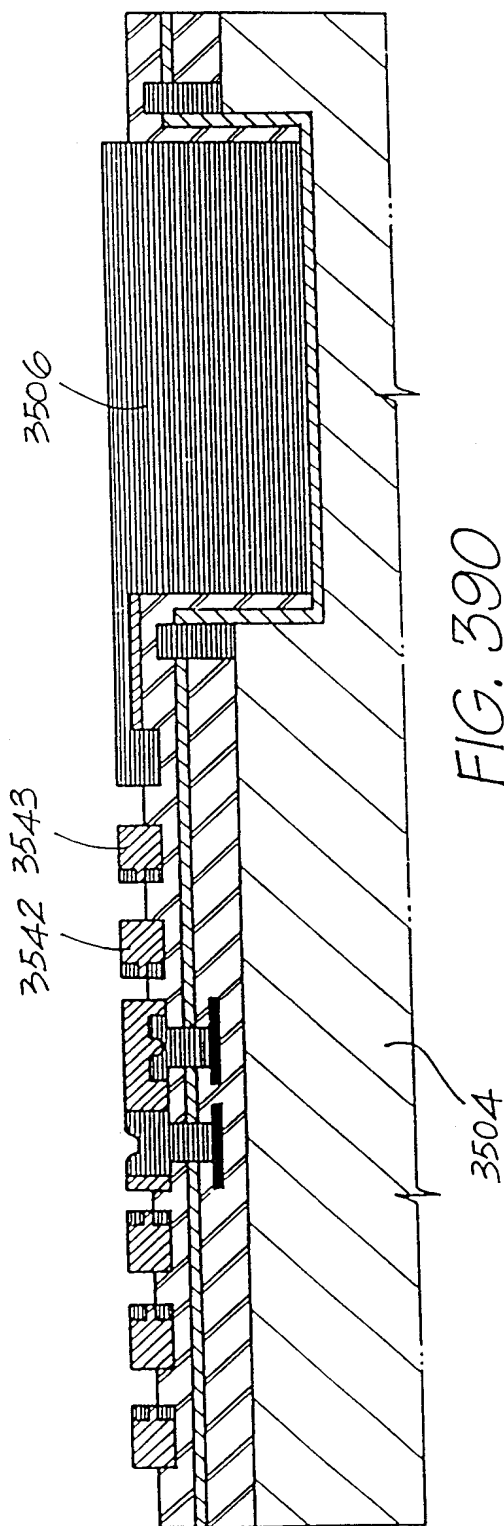
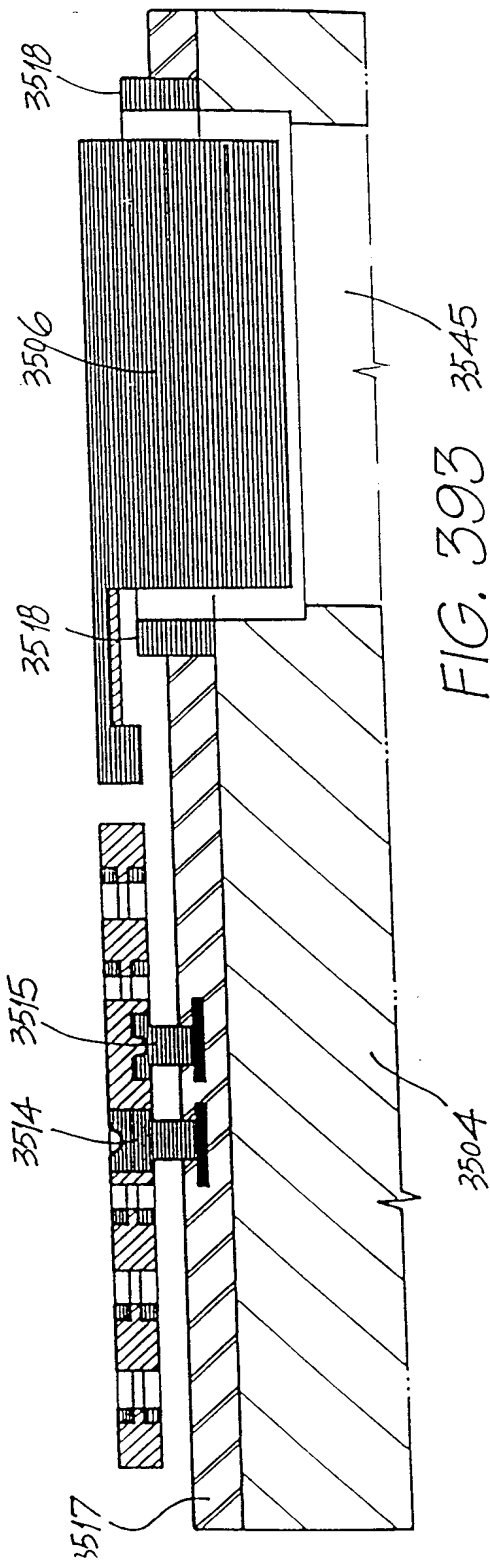
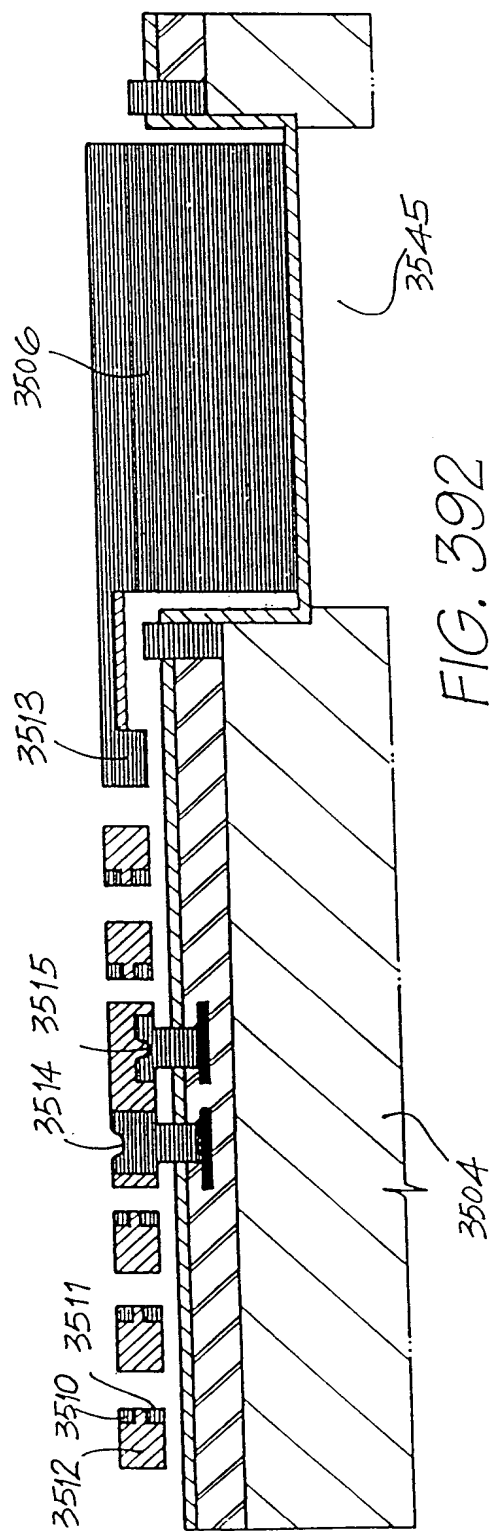


FIG. 389

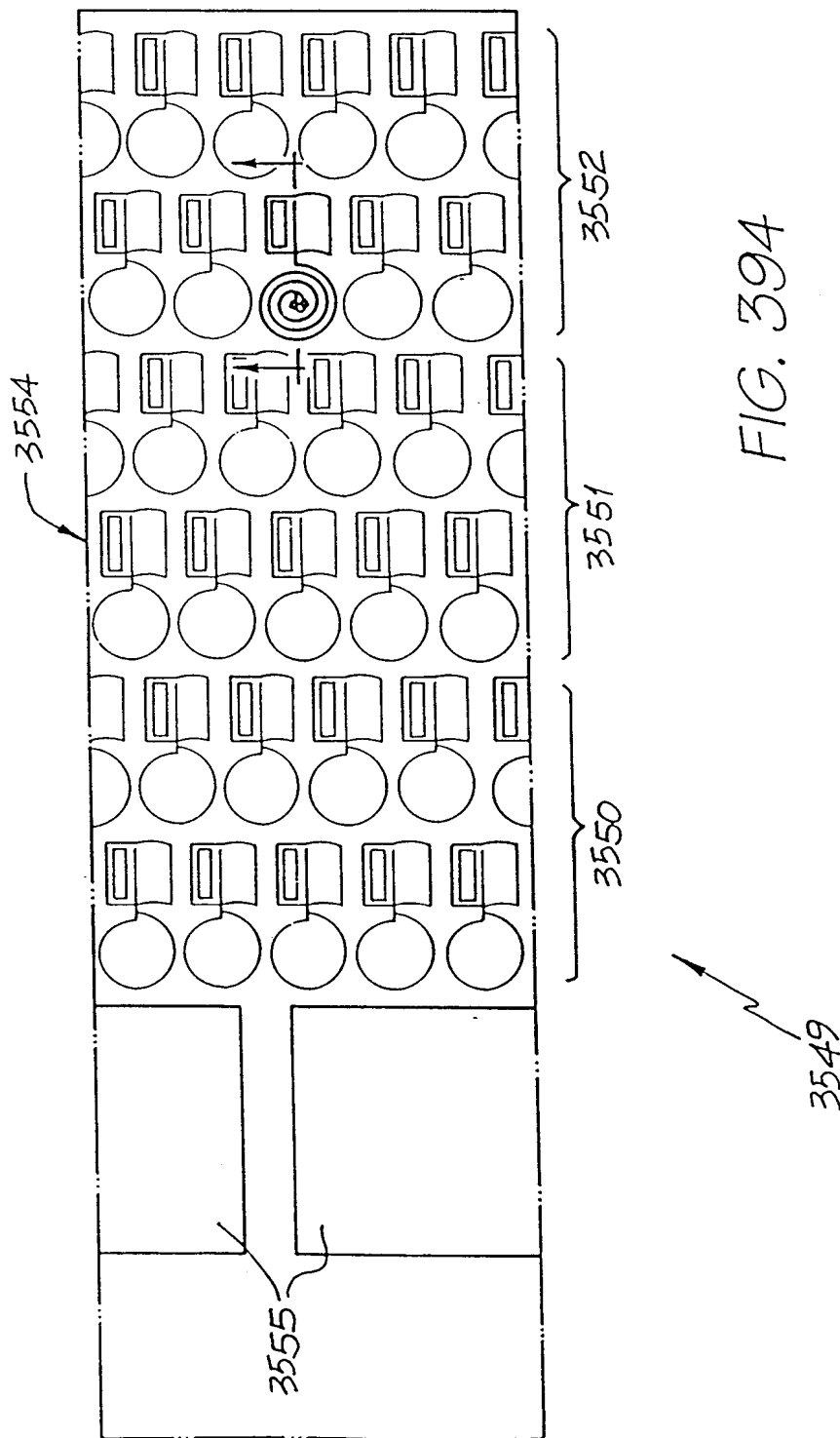
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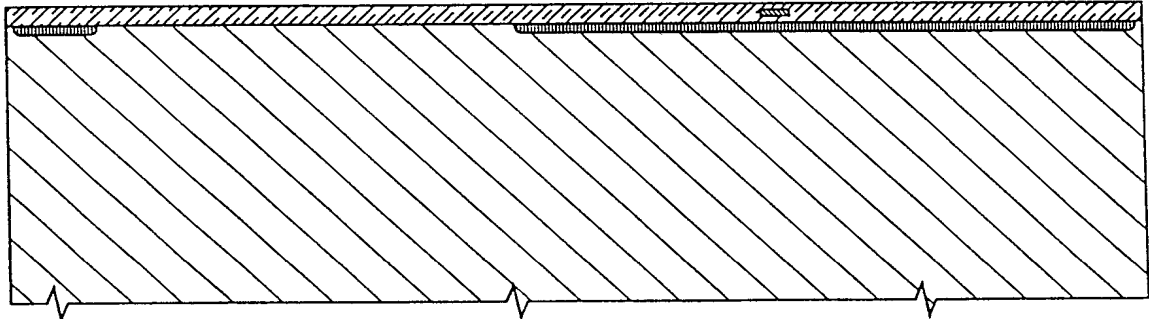
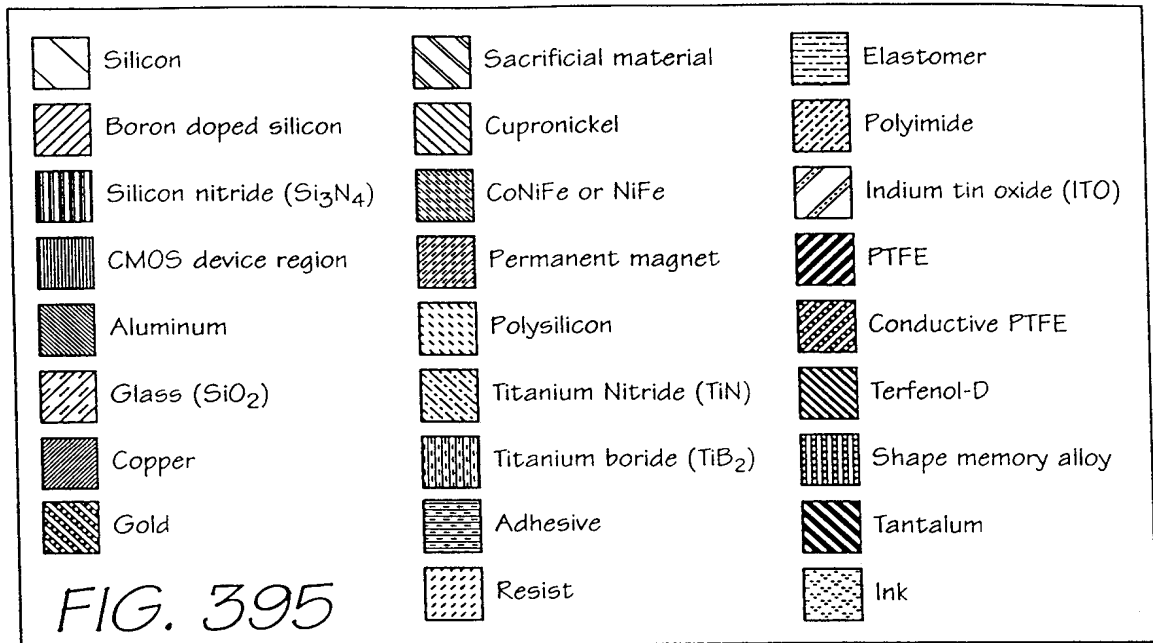
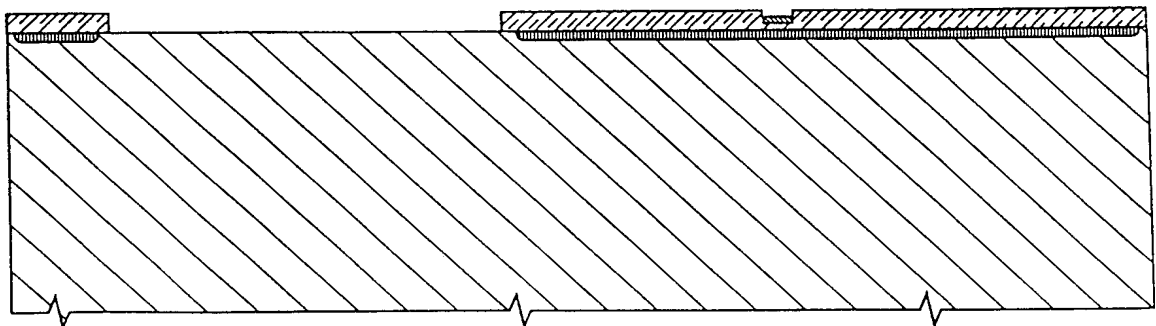
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*FIG. 396**FIG. 397*

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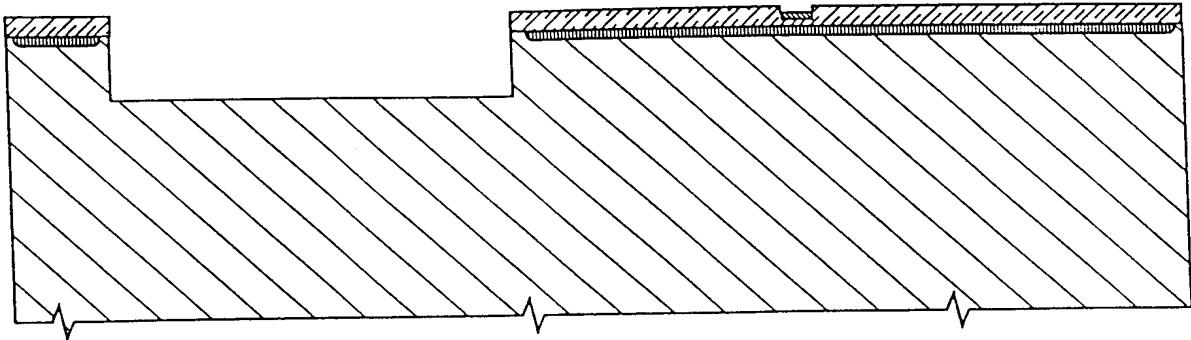


FIG. 398

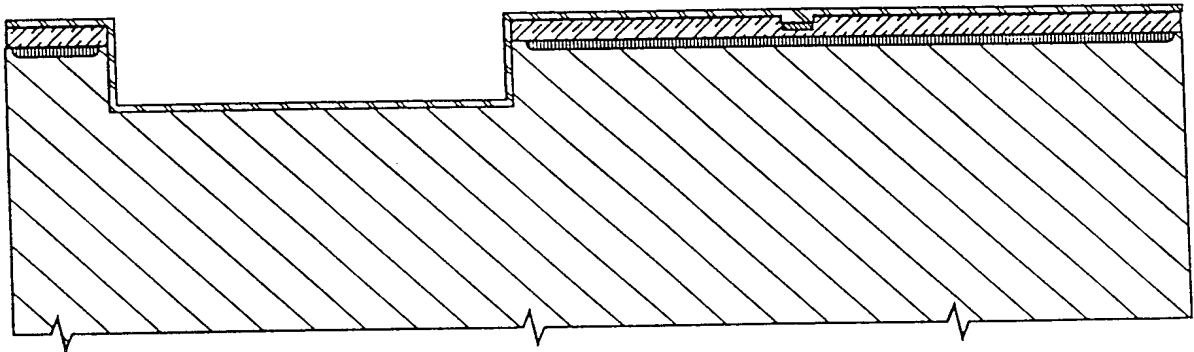


FIG. 399

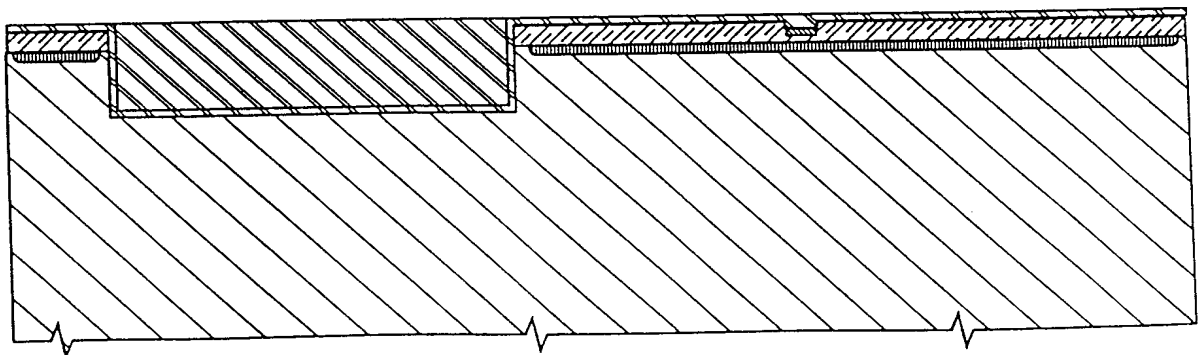


FIG. 400

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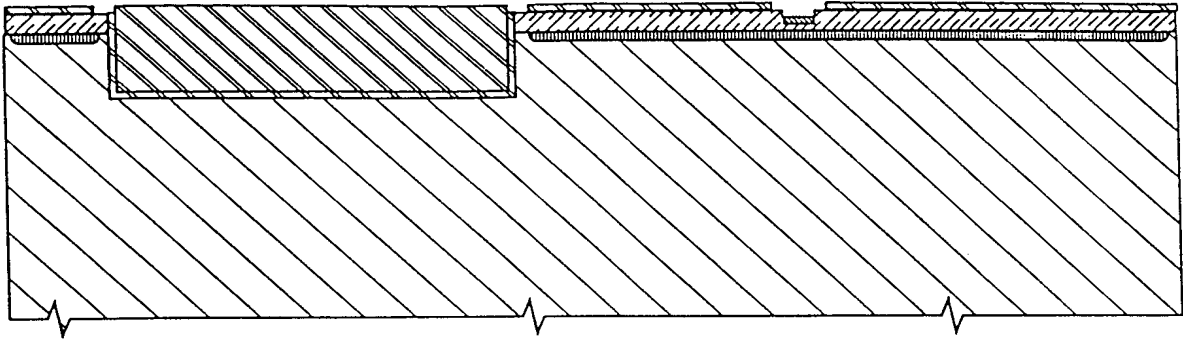


FIG. 401

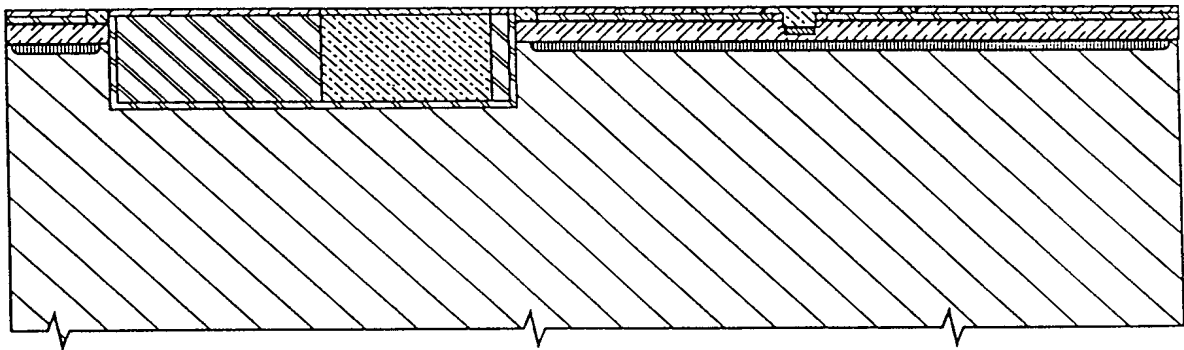


FIG. 402

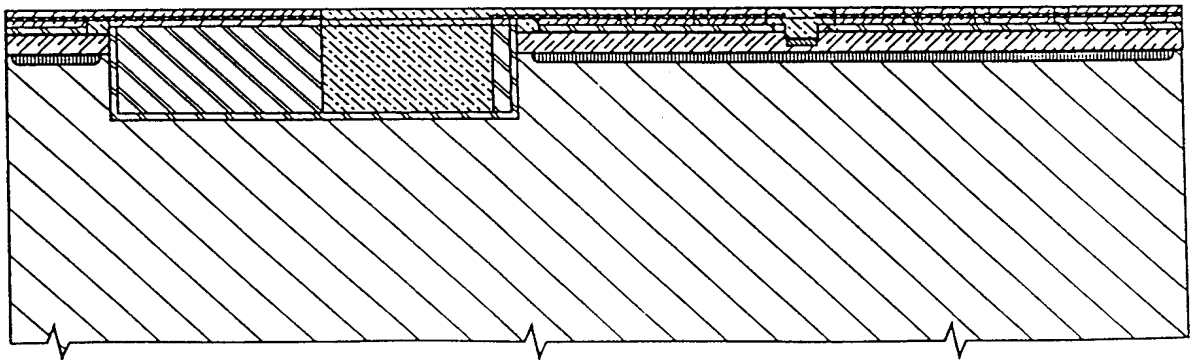


FIG. 403

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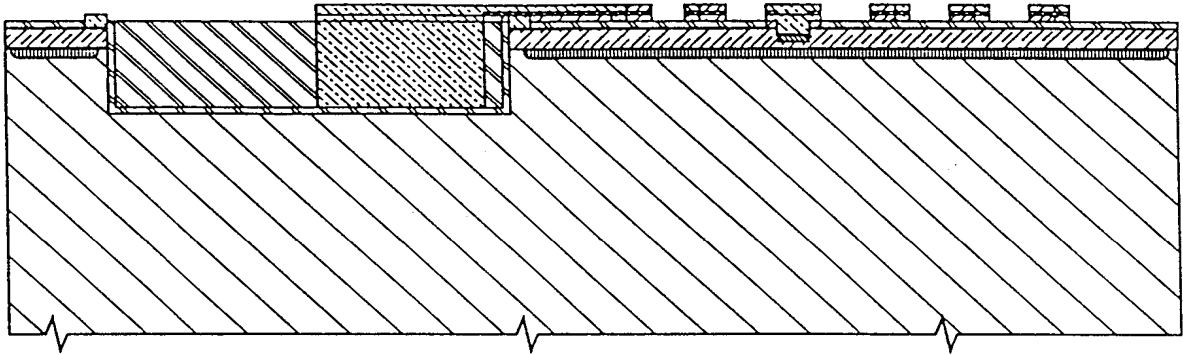


FIG. 404

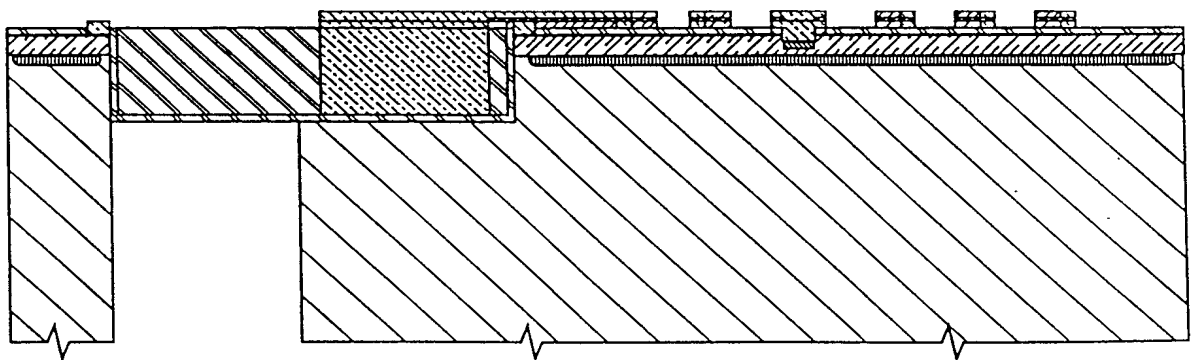


FIG. 405

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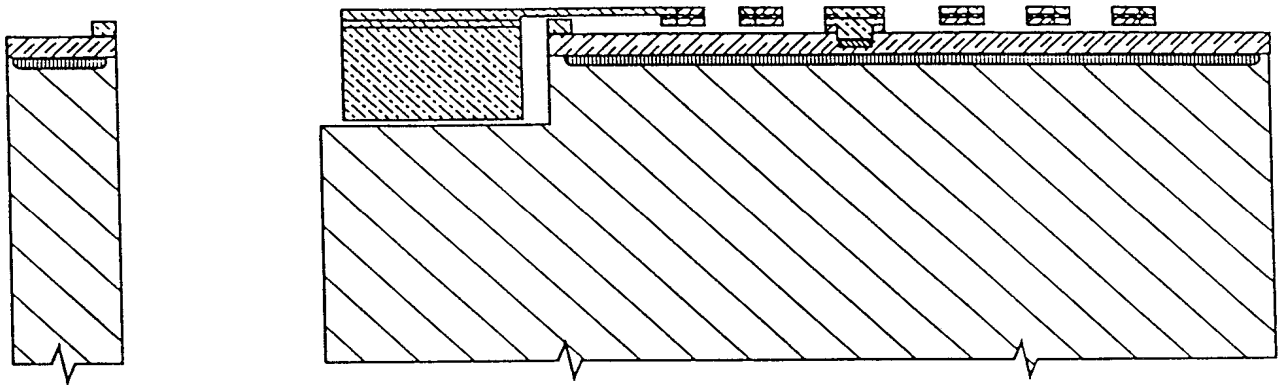


FIG. 406

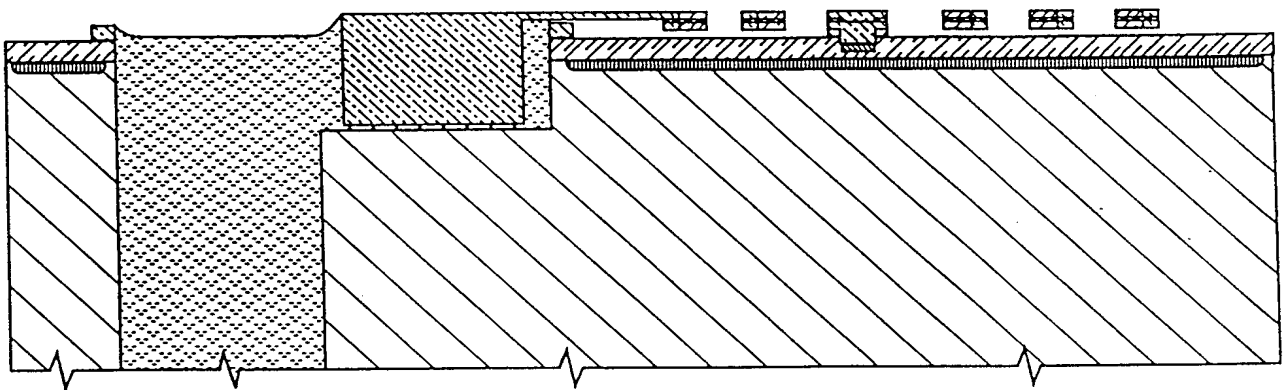
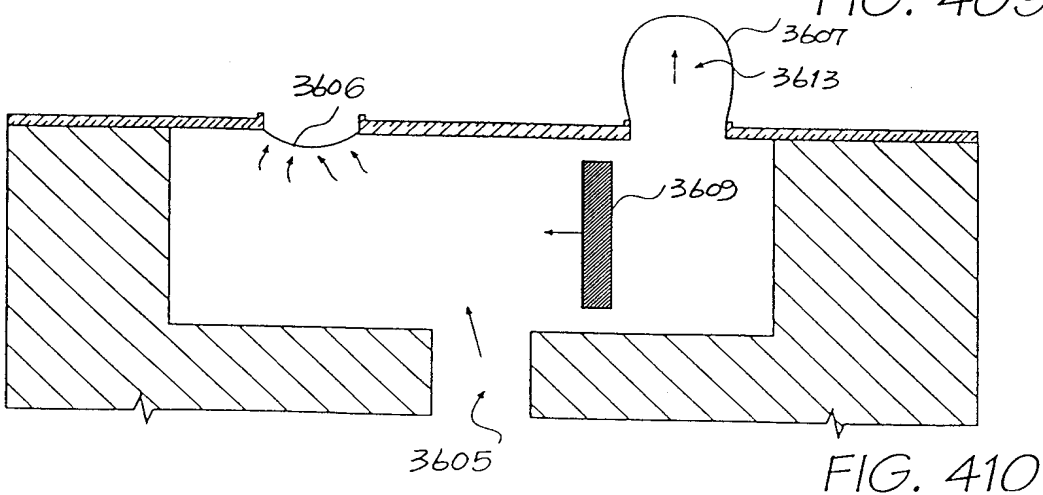
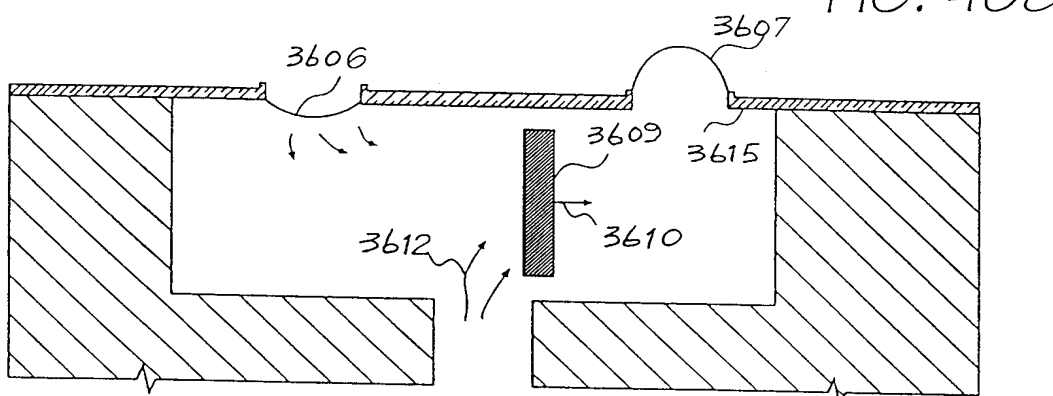
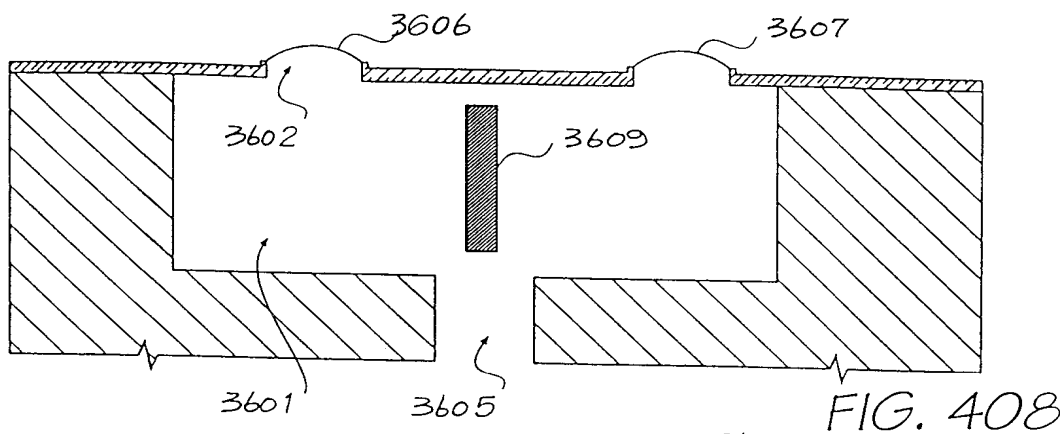


FIG. 407

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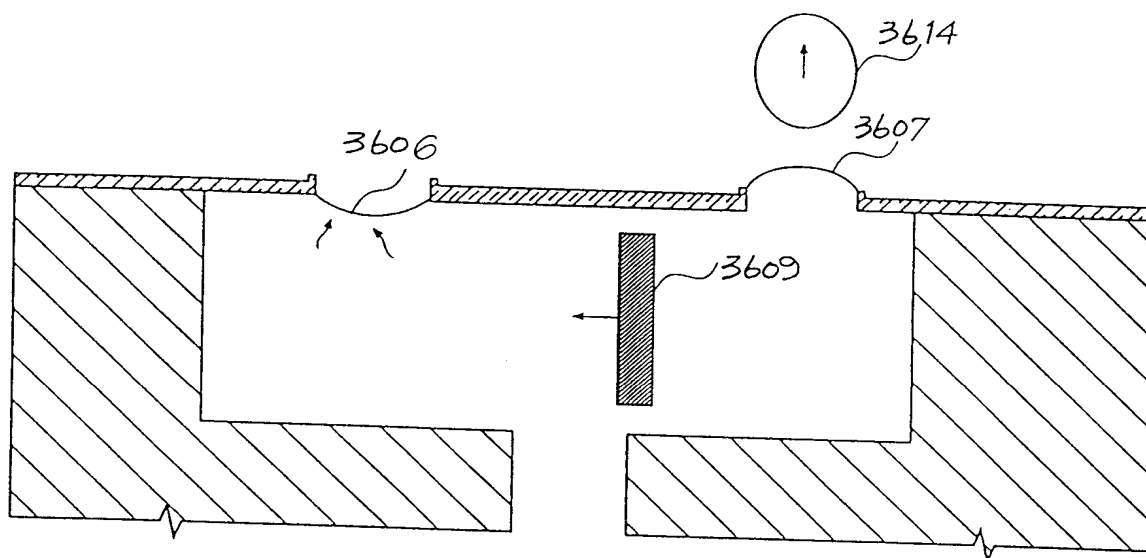


FIG. 411

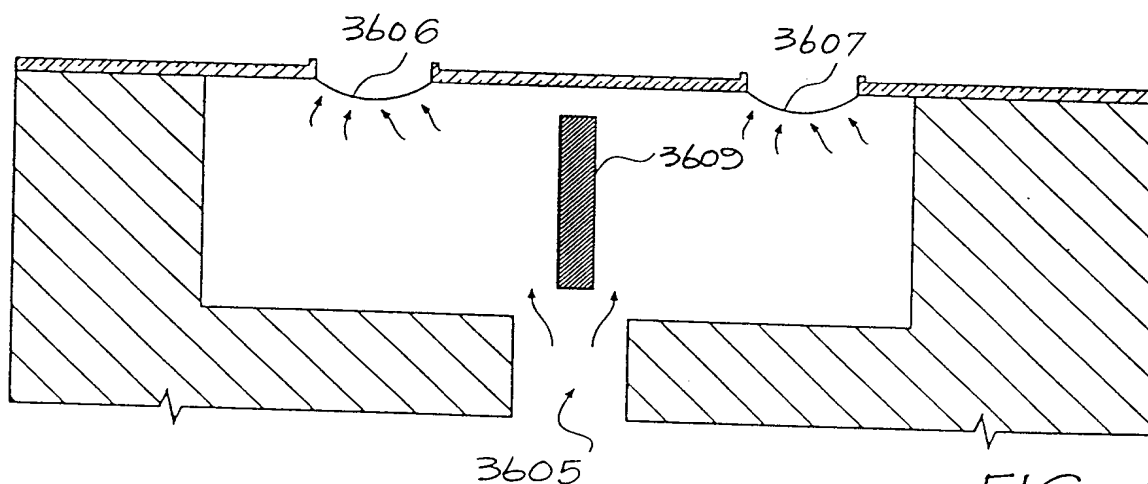


FIG. 412

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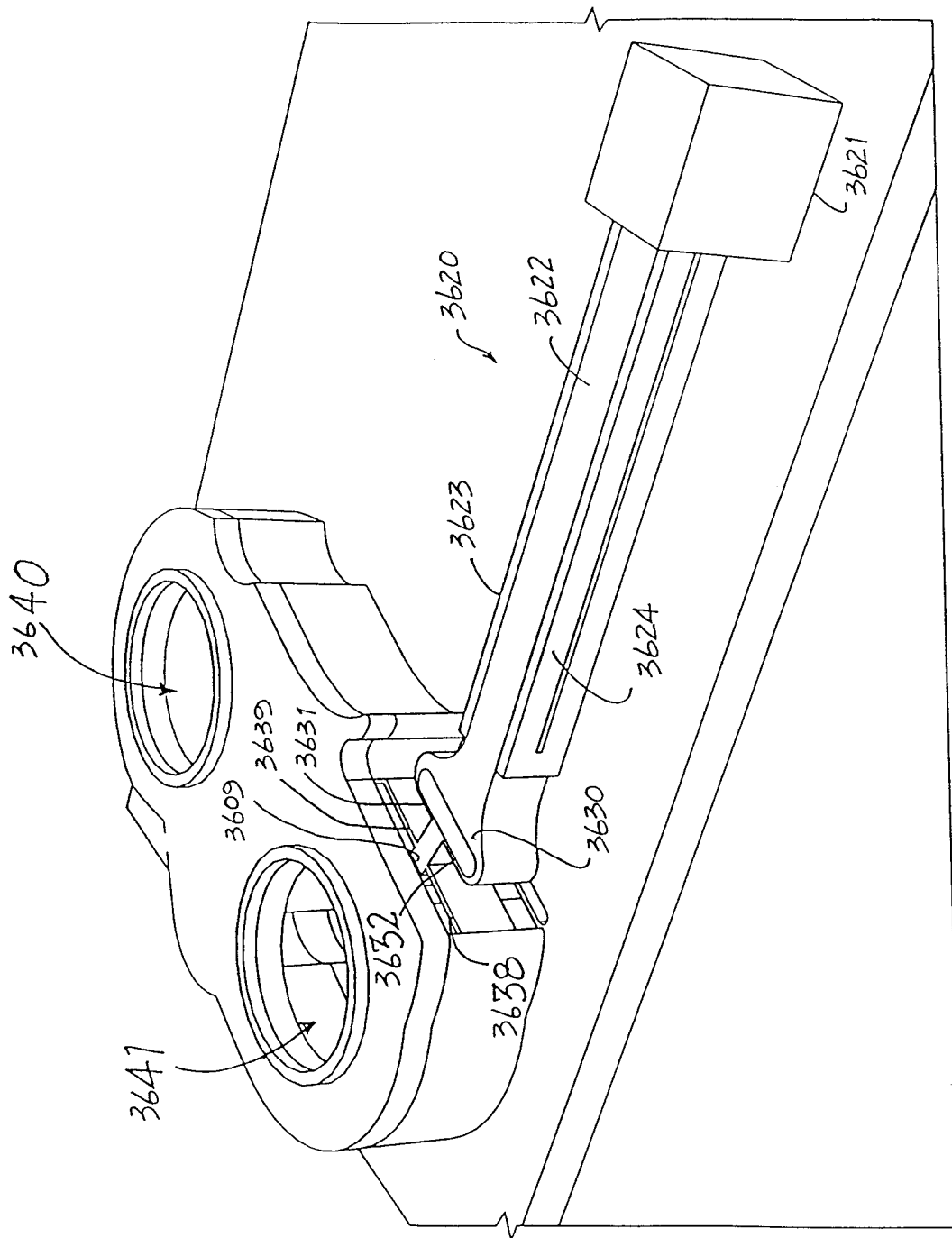
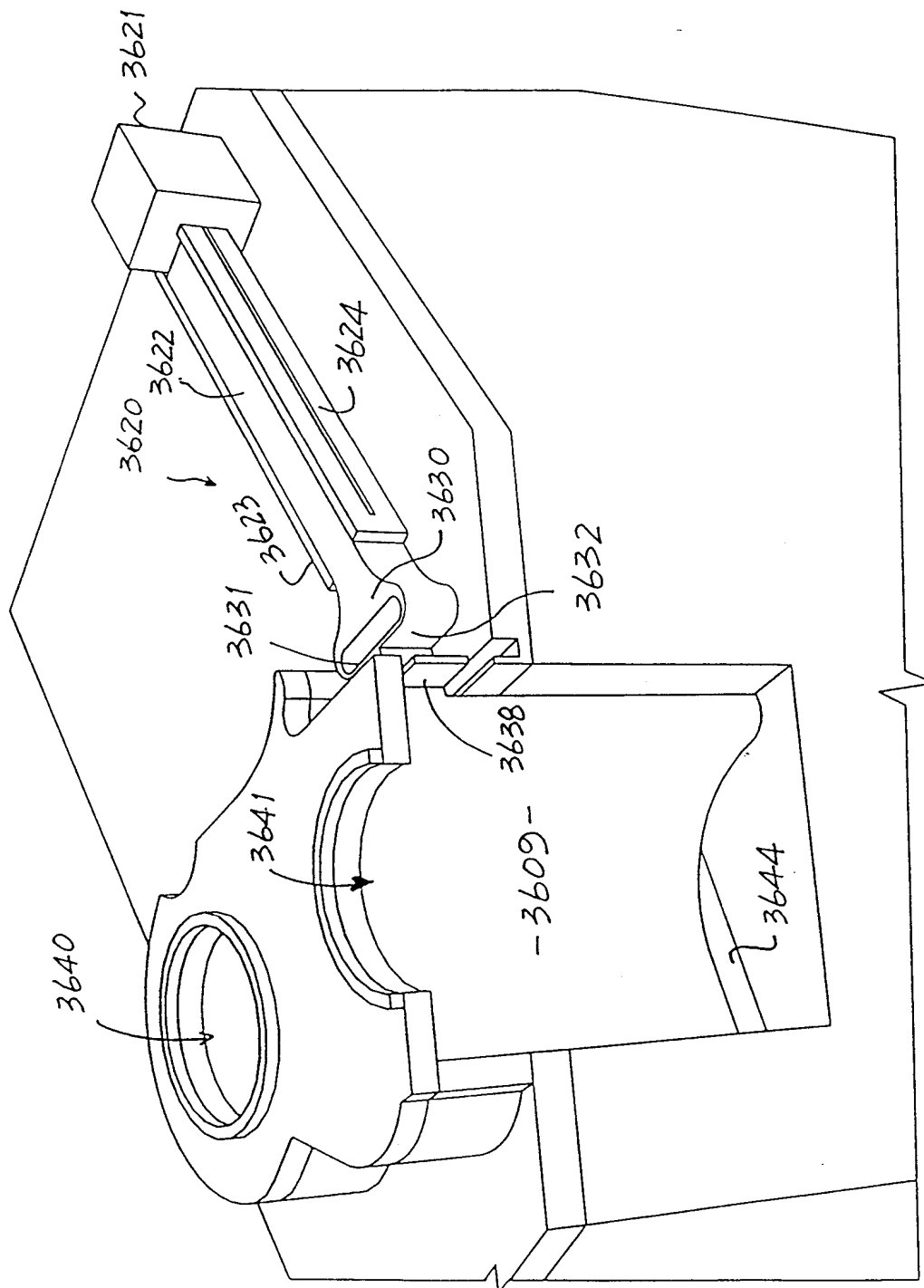


FIG. 413

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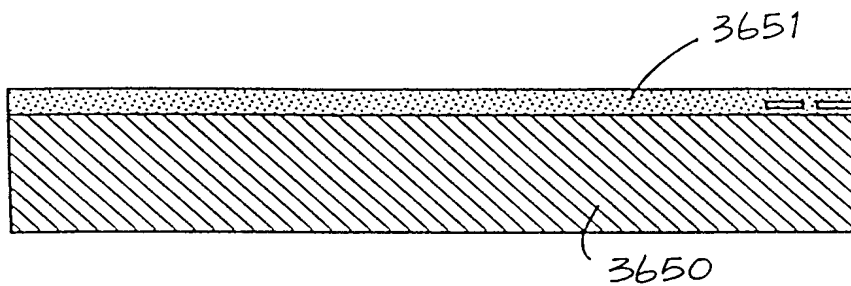


FIG. 415

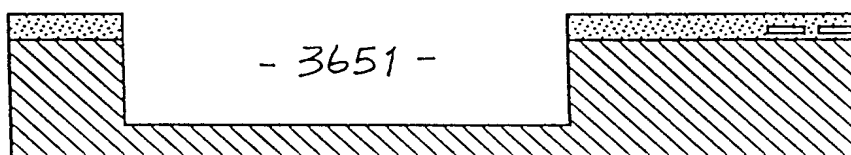


FIG. 416

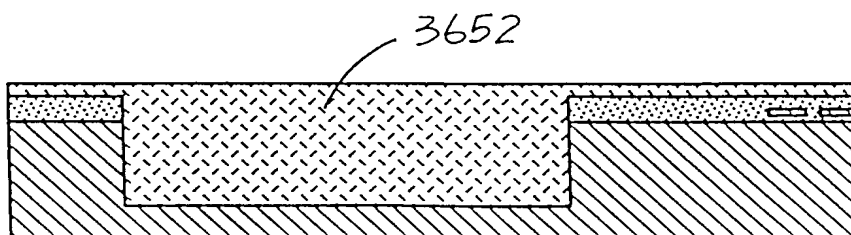


FIG. 417

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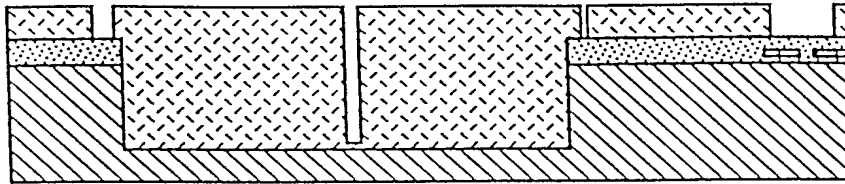


FIG. 418

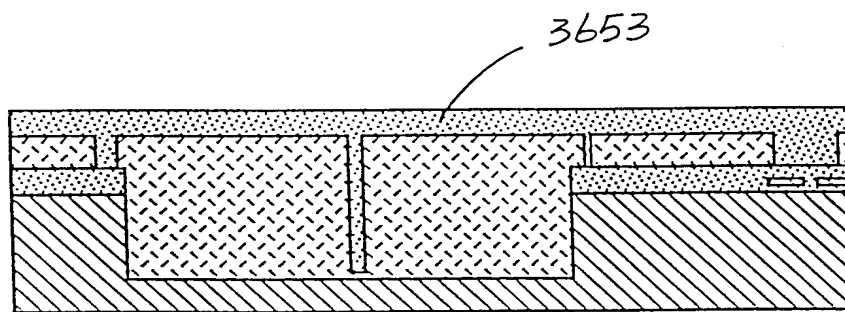


FIG. 419

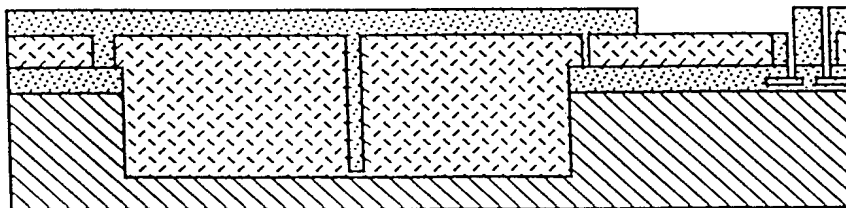


FIG. 420

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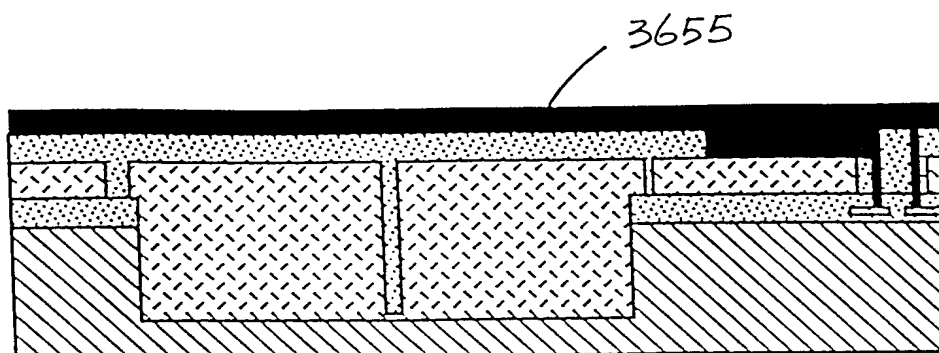


FIG. 421

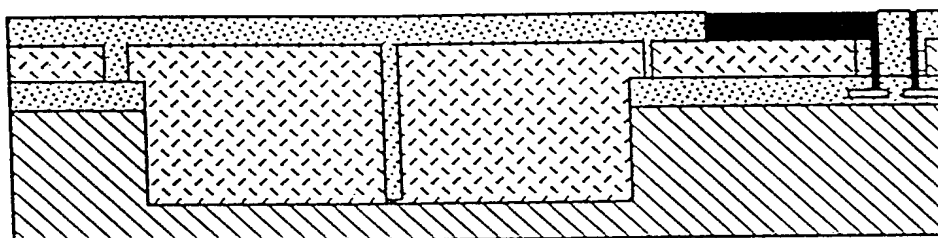


FIG. 422

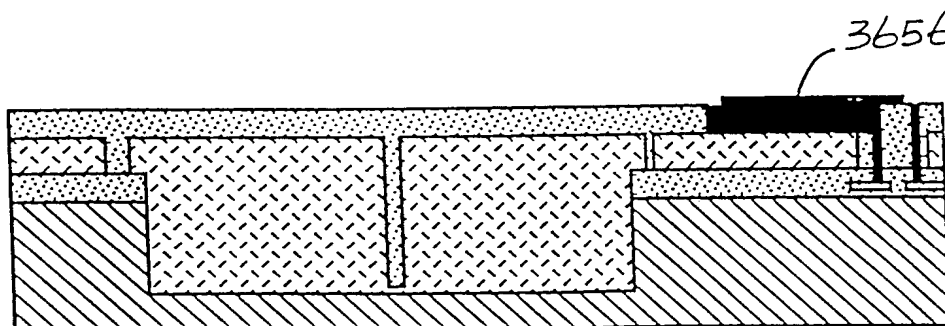


FIG. 423

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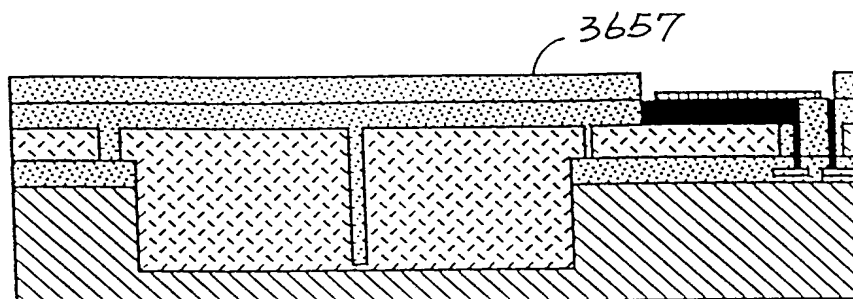


FIG. 424

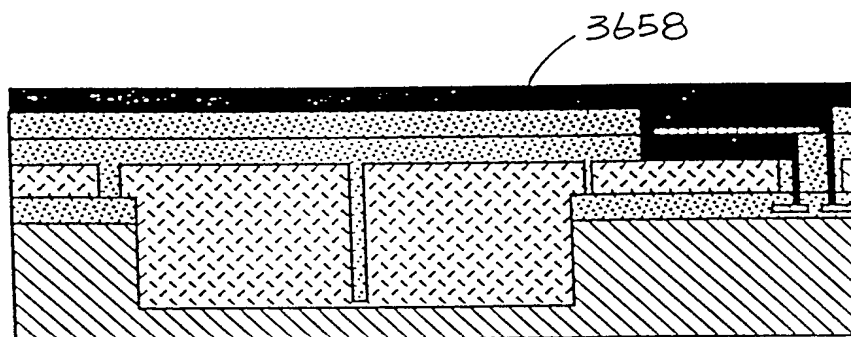


FIG. 425

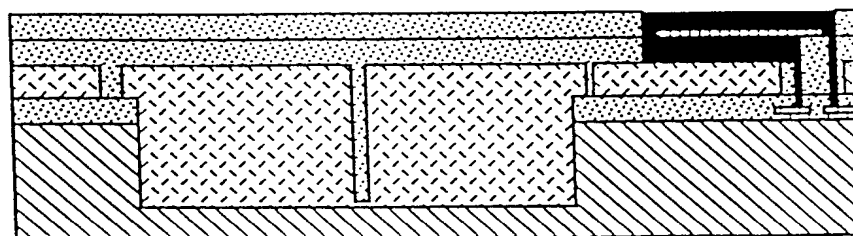


FIG. 426

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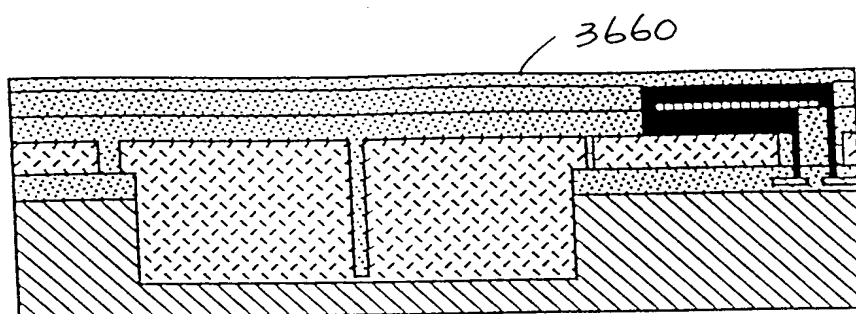


FIG. 427

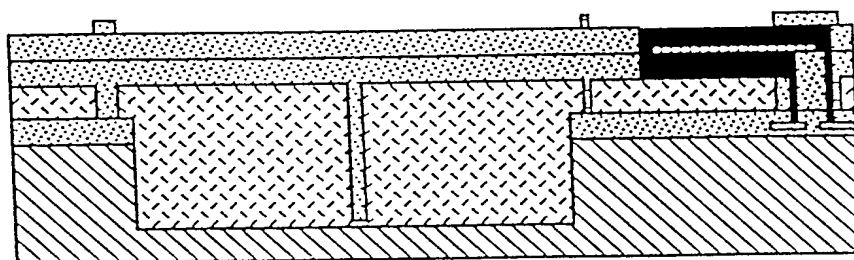


FIG. 428

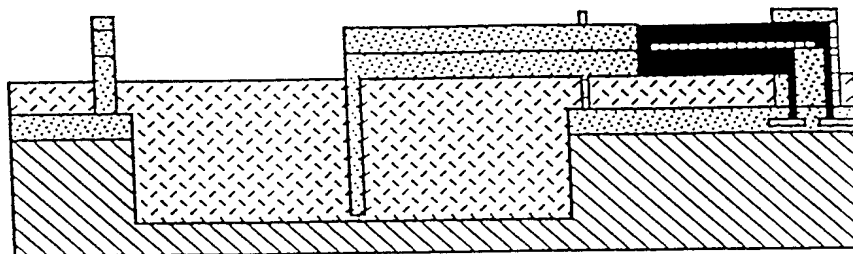


FIG. 429

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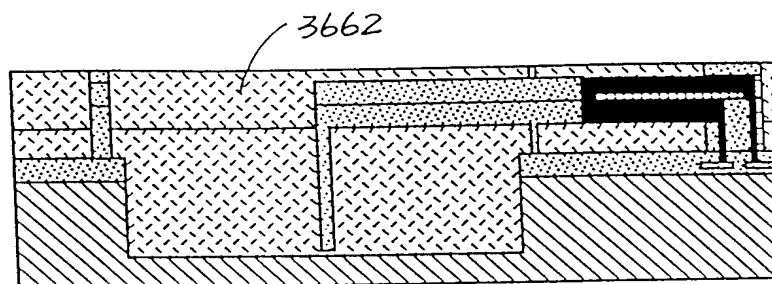


FIG. 430

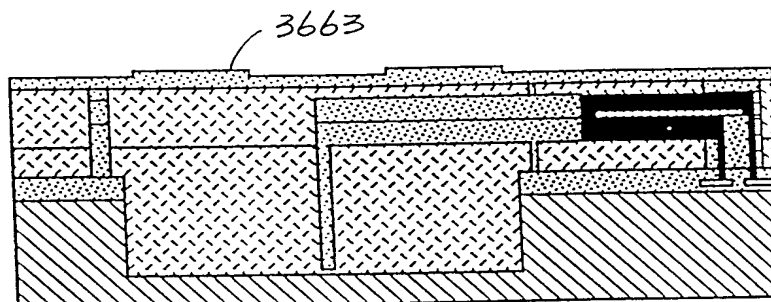


FIG. 431

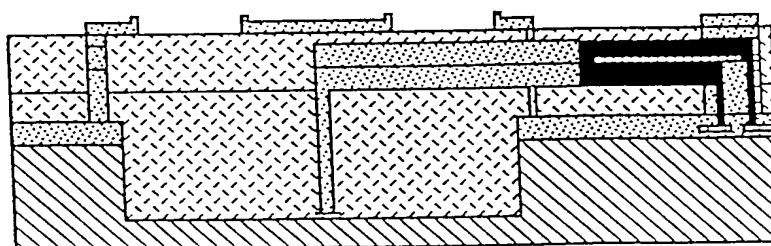
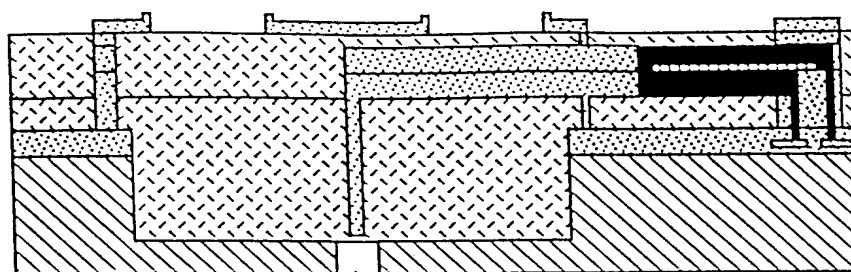


FIG. 432

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FIG. 433

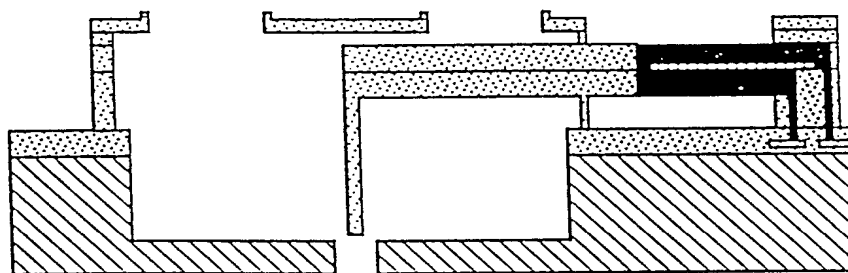


FIG. 434

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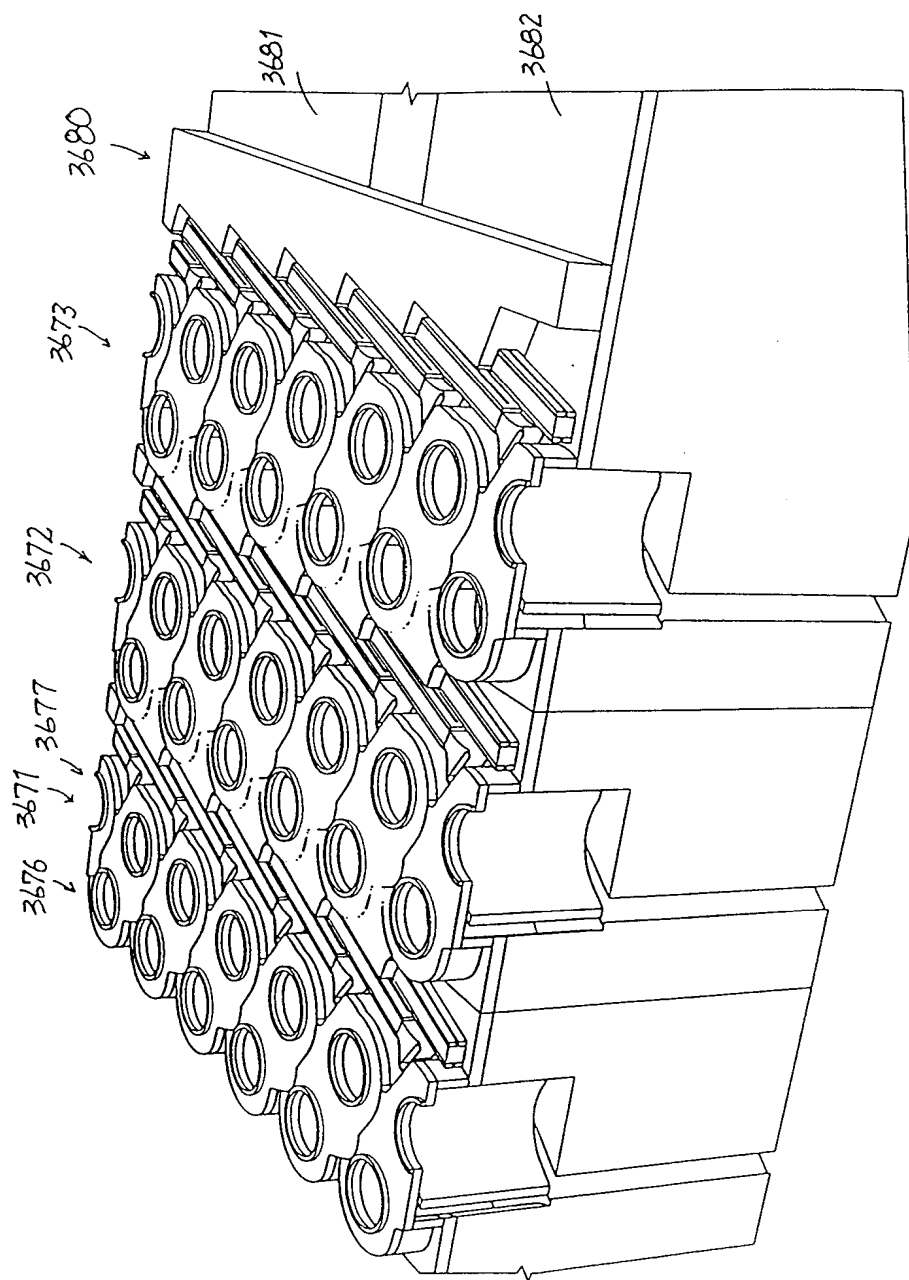


FIG. 435

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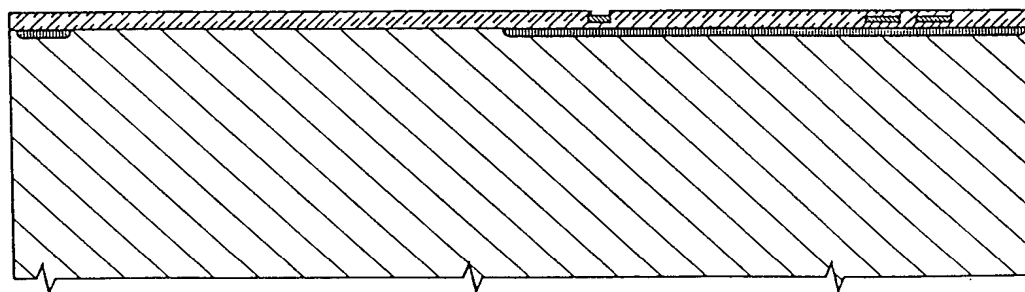
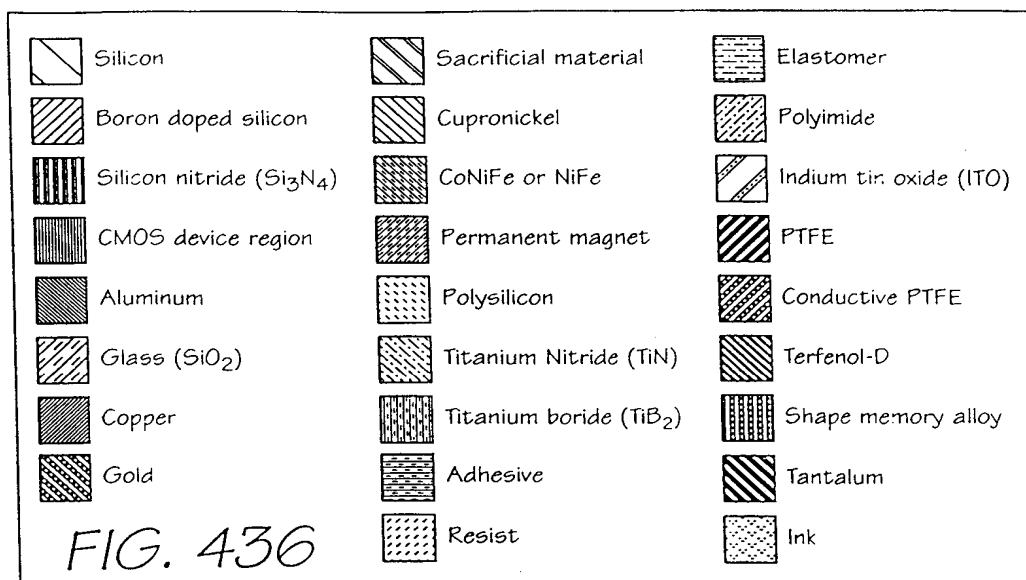


FIG. 437

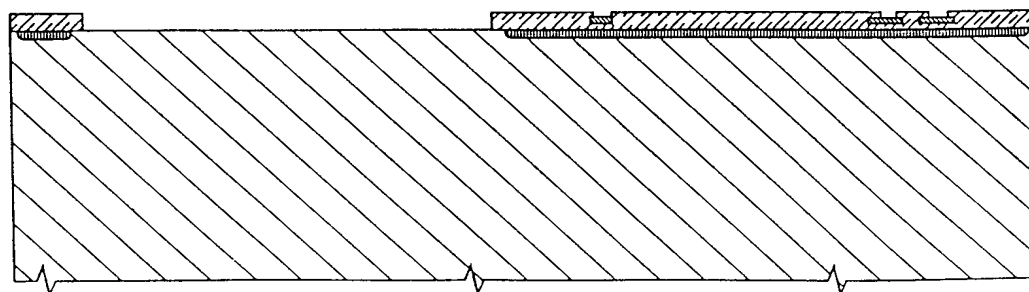


FIG. 438

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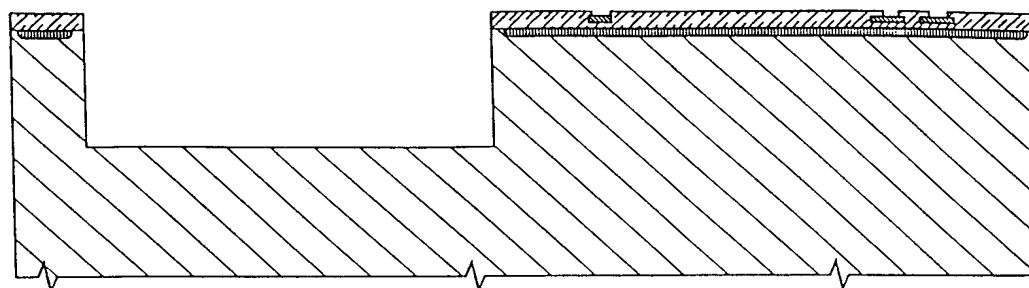


FIG. 439

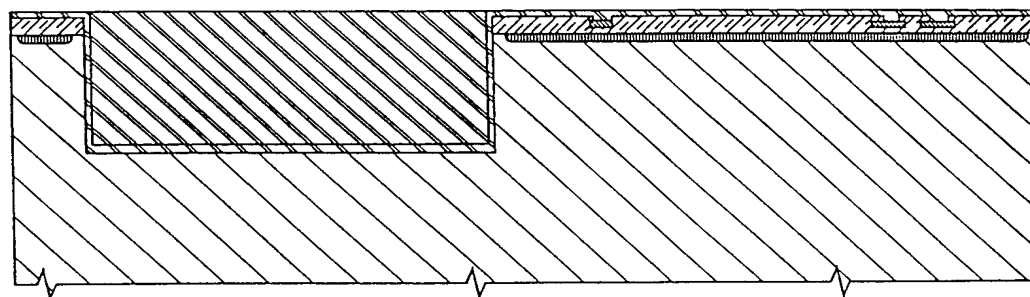


FIG. 440

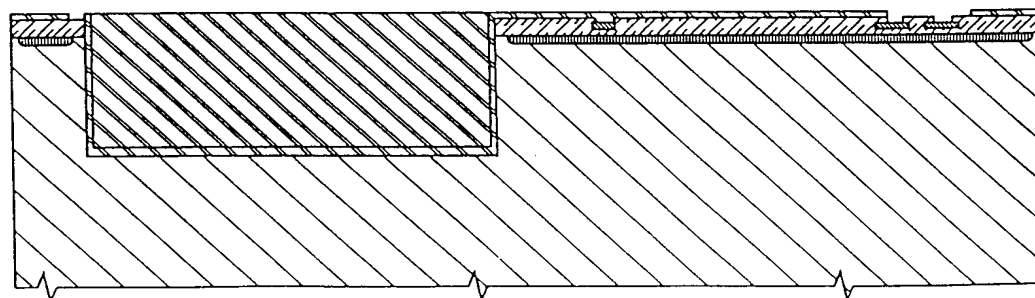


FIG. 441

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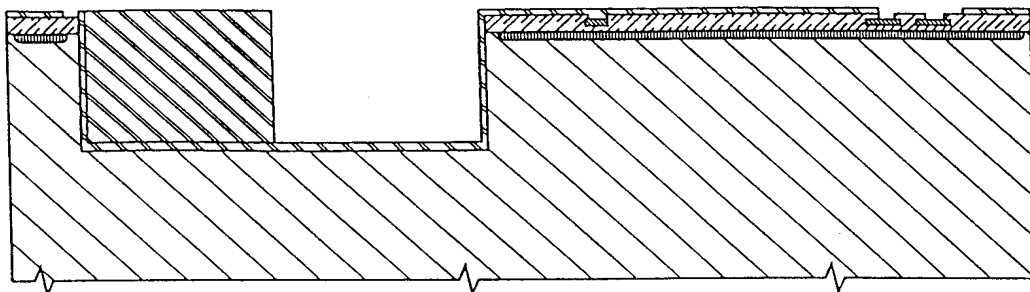


FIG. 442

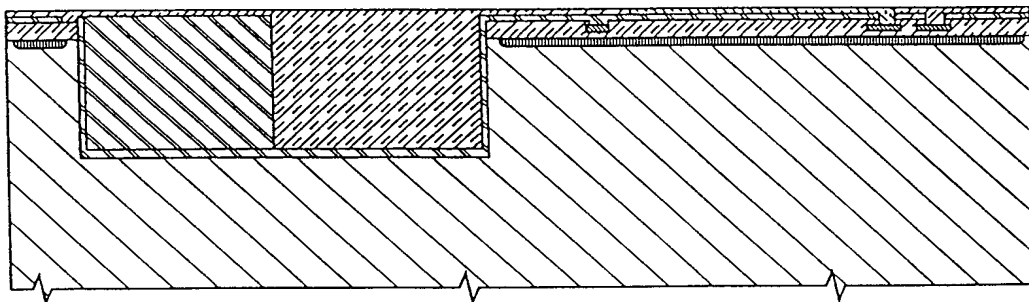


FIG. 443

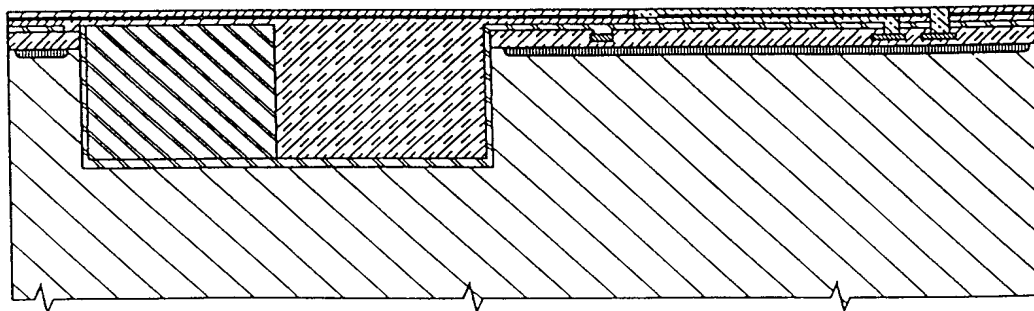


FIG. 444

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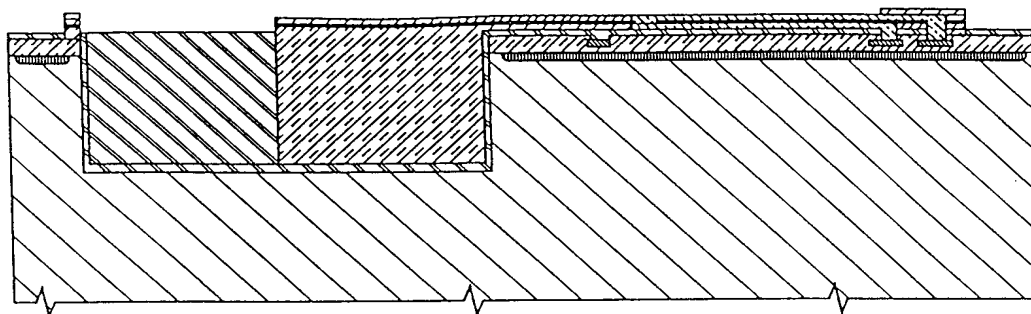


FIG. 445

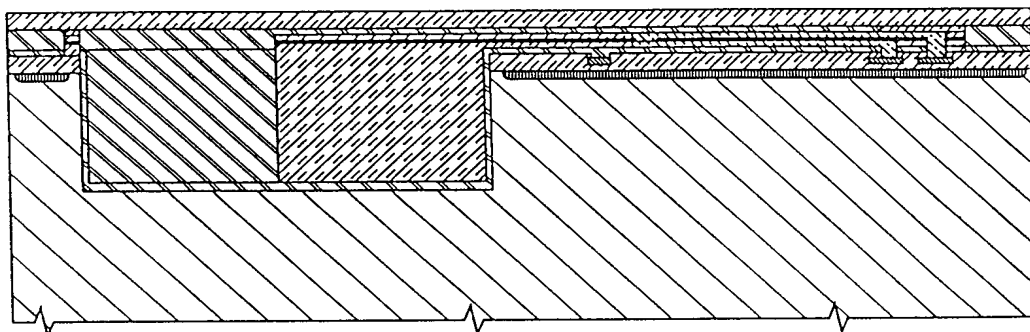


FIG. 446

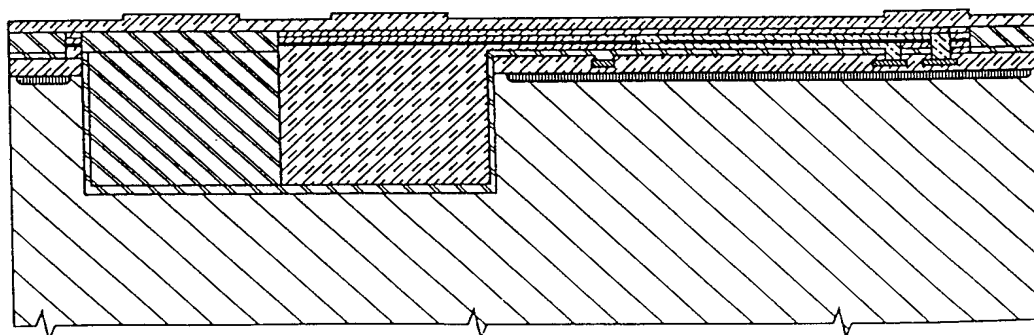


FIG. 447

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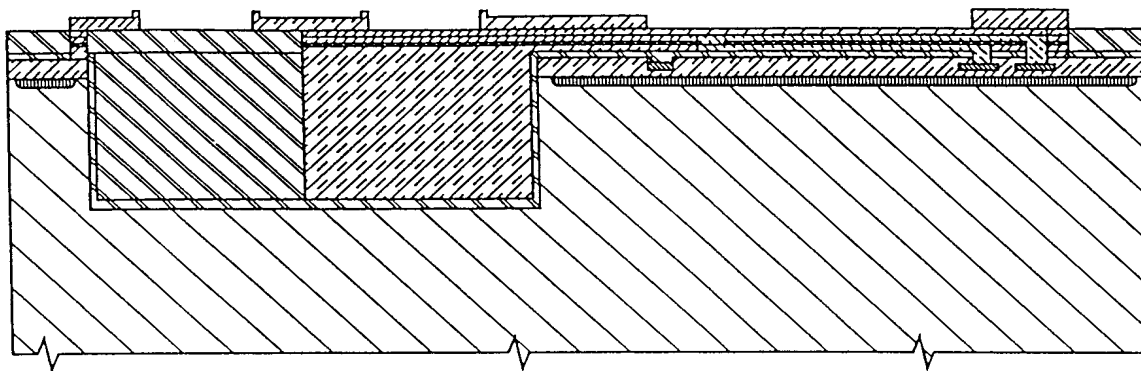


FIG. 448

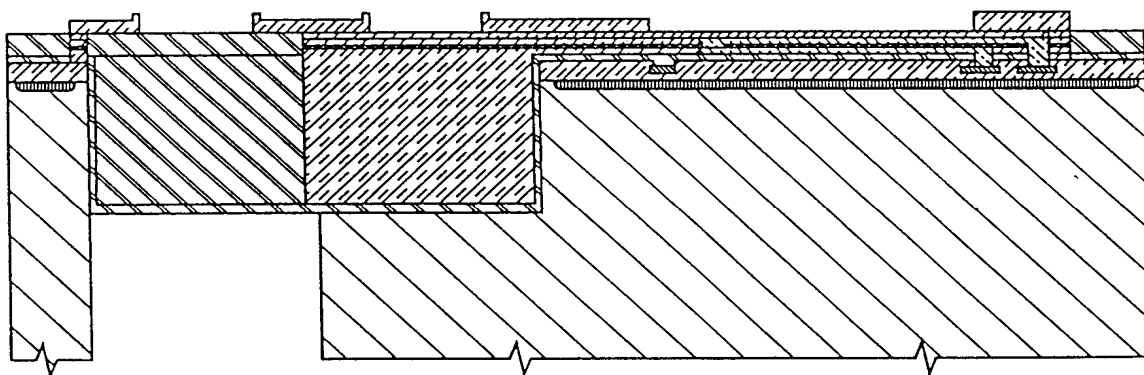


FIG. 449

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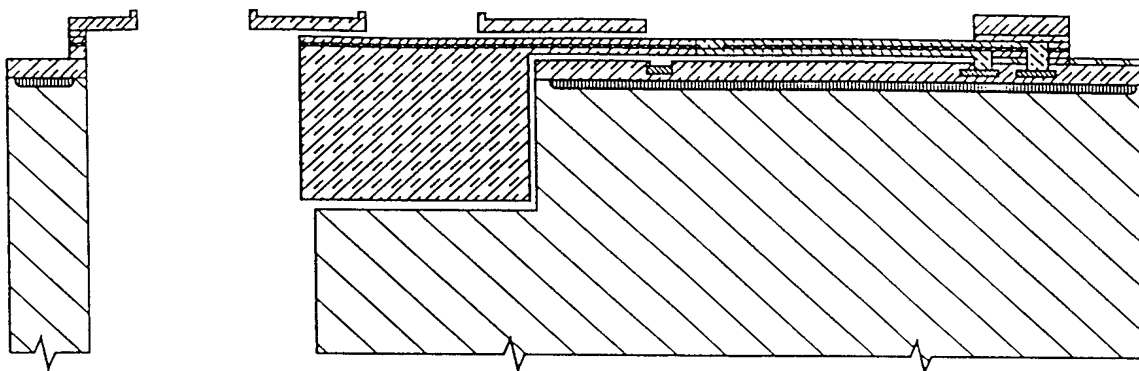


FIG. 450

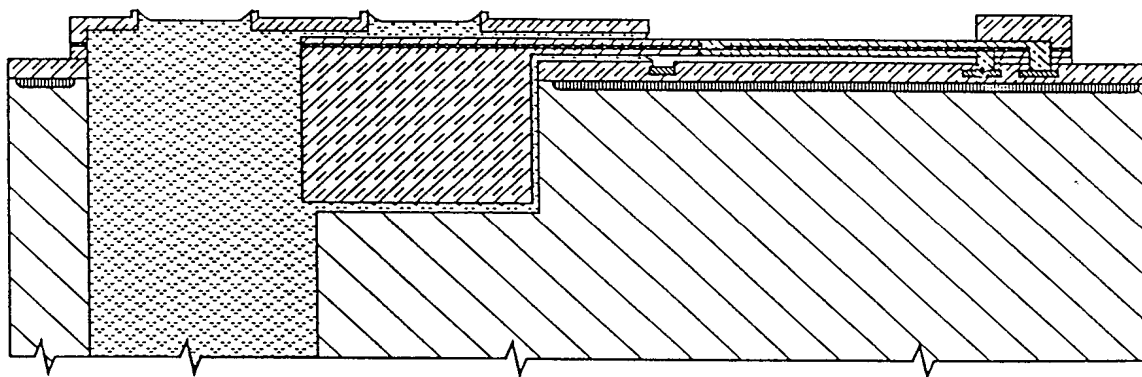


FIG. 451

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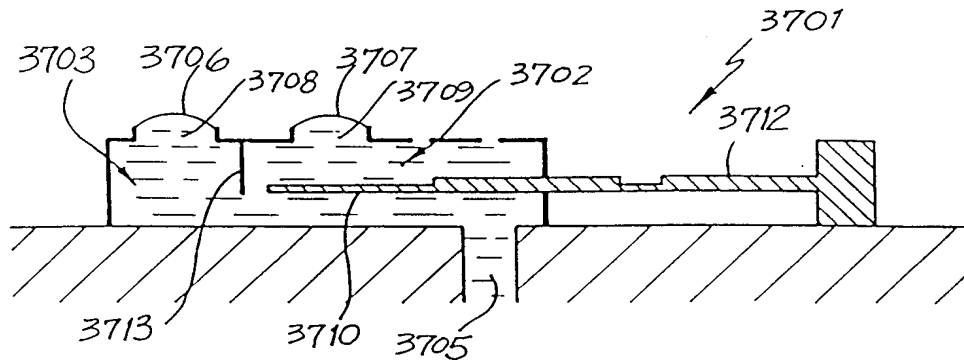


FIG. 452

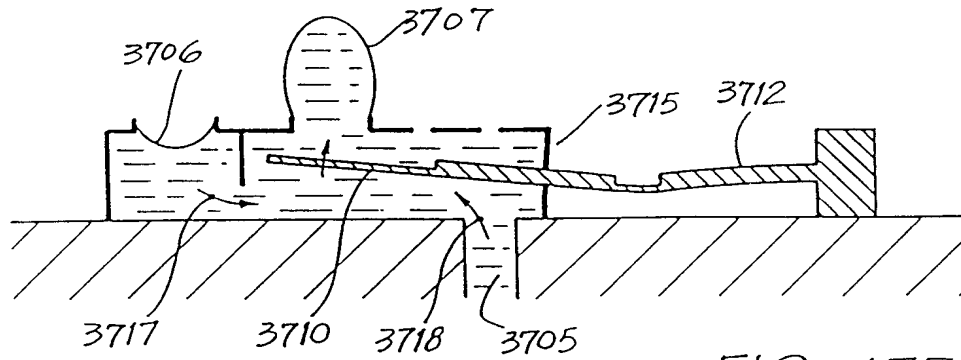


FIG. 453

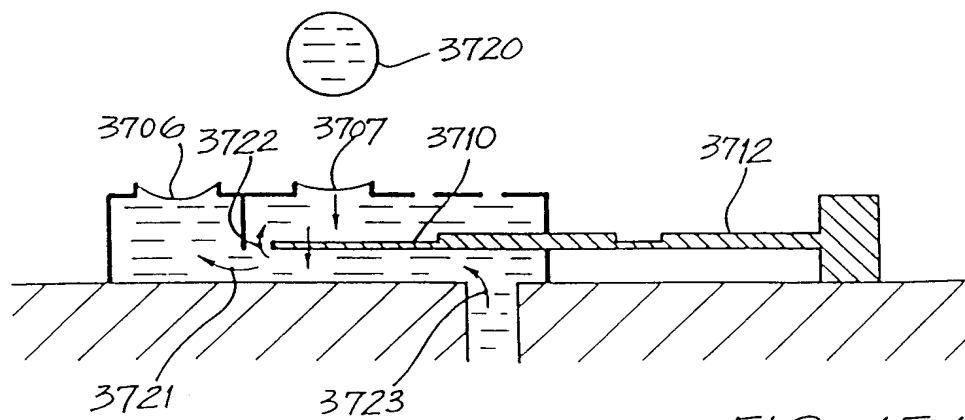


FIG. 454

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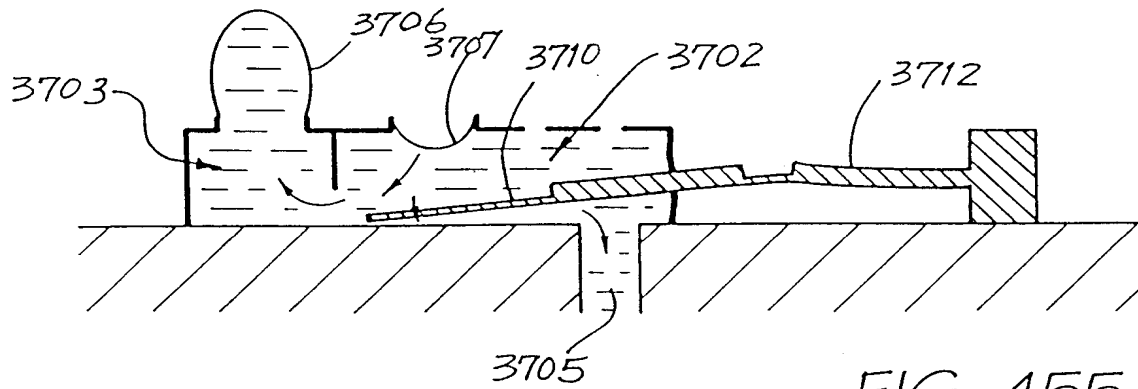


FIG. 455

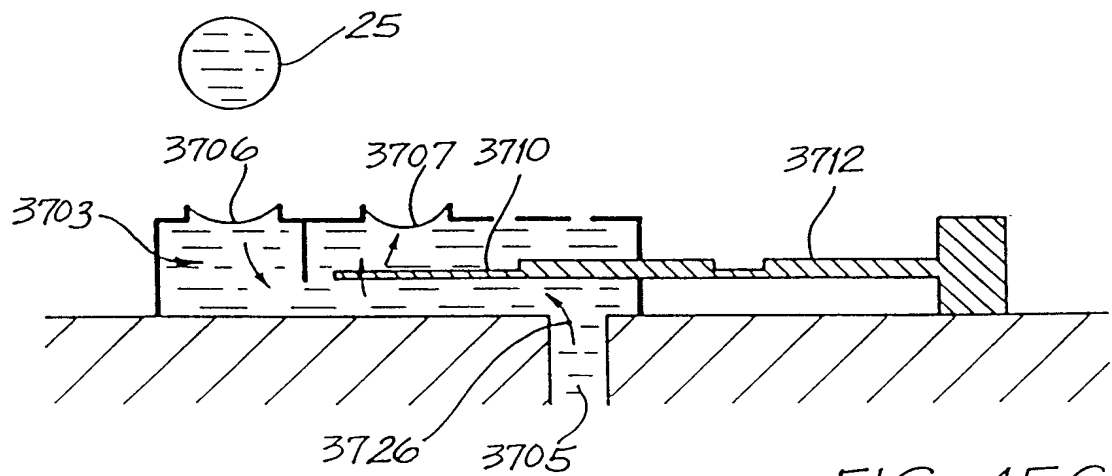


FIG. 456

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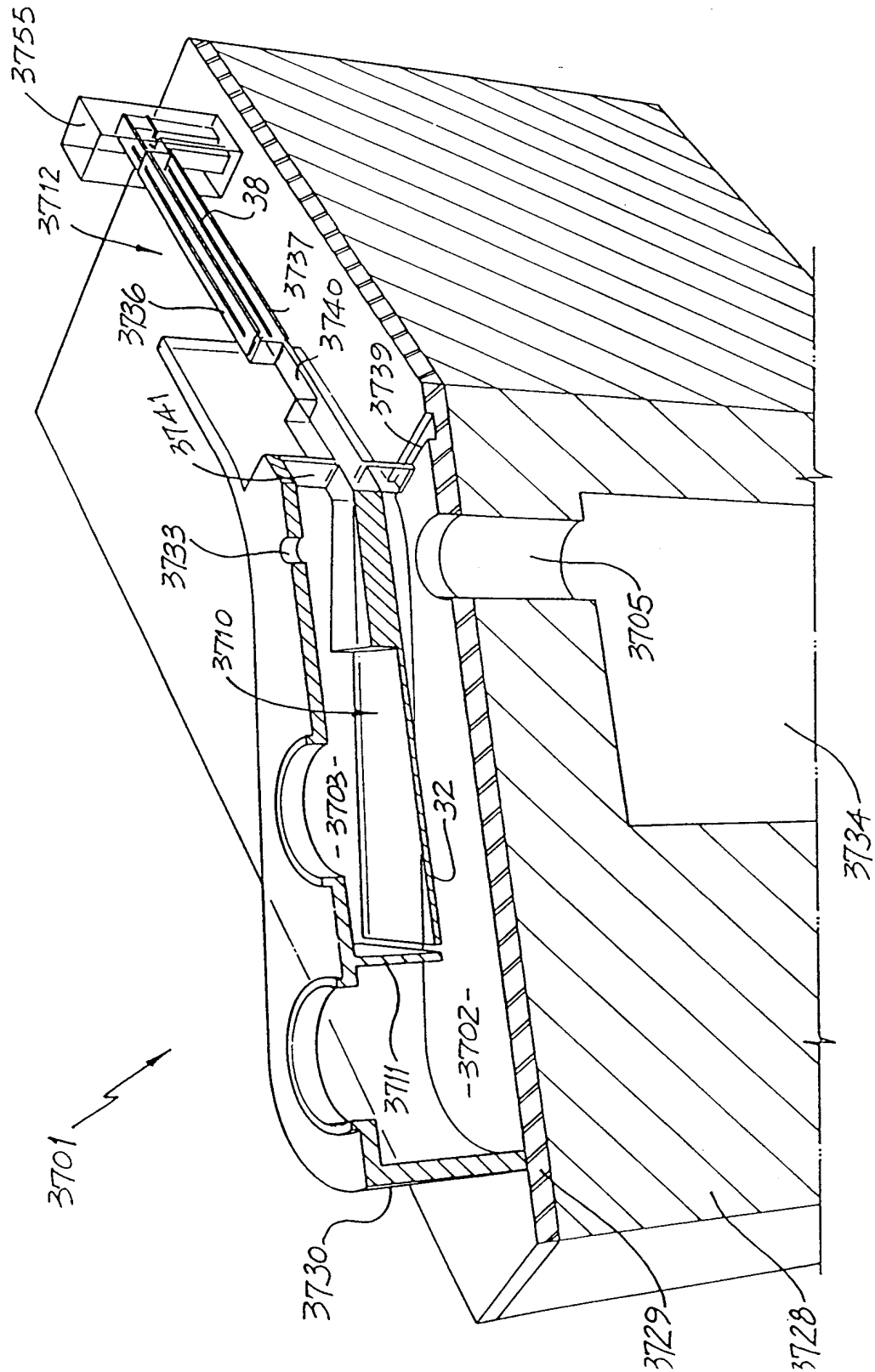
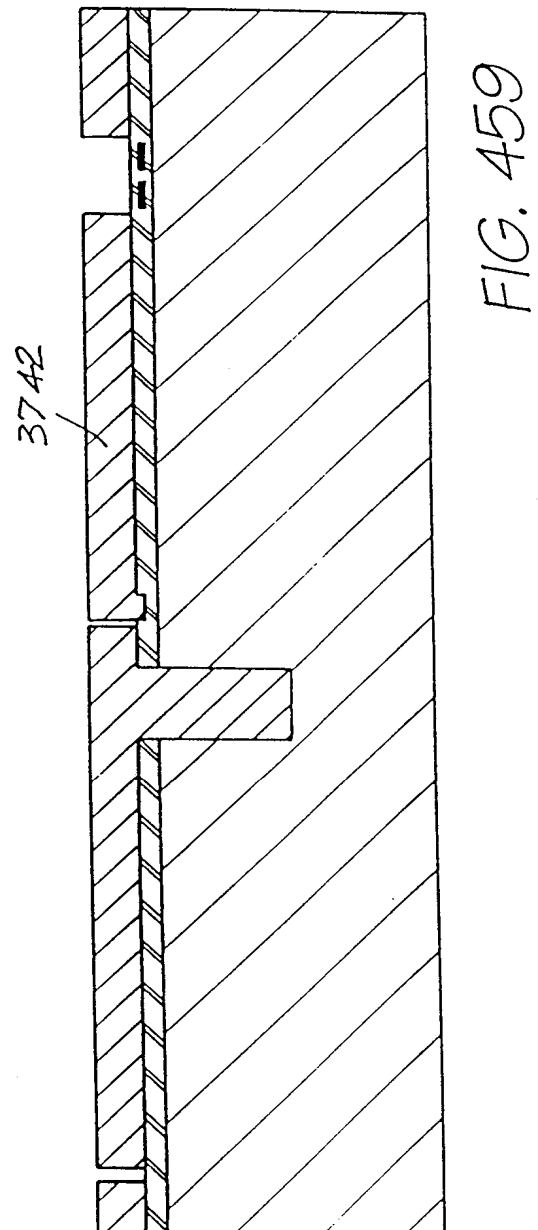
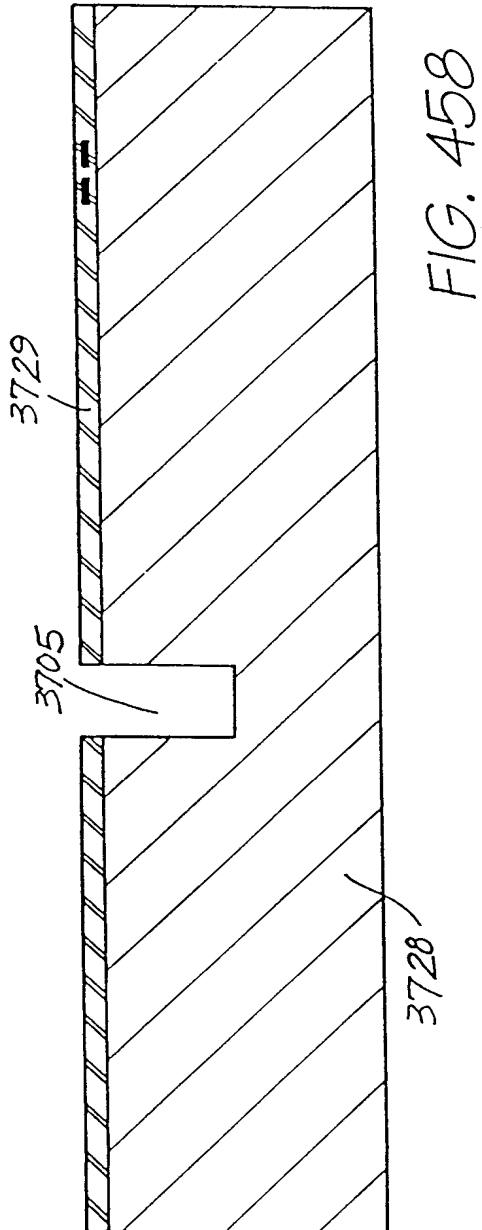


FIG. 457

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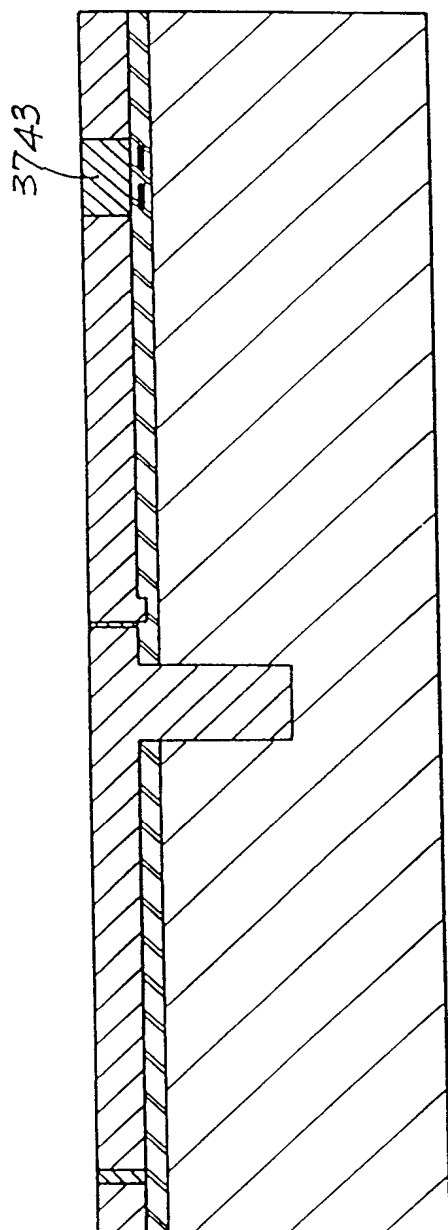


FIG. 460

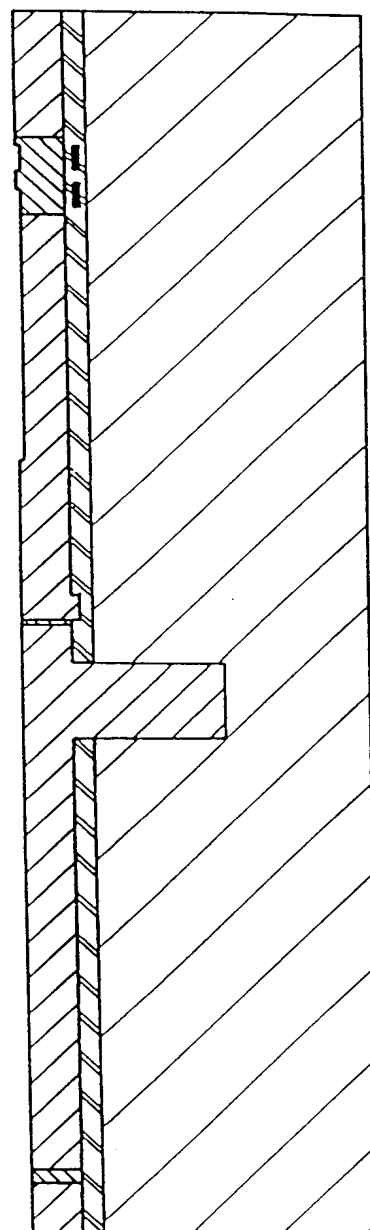


FIG. 461

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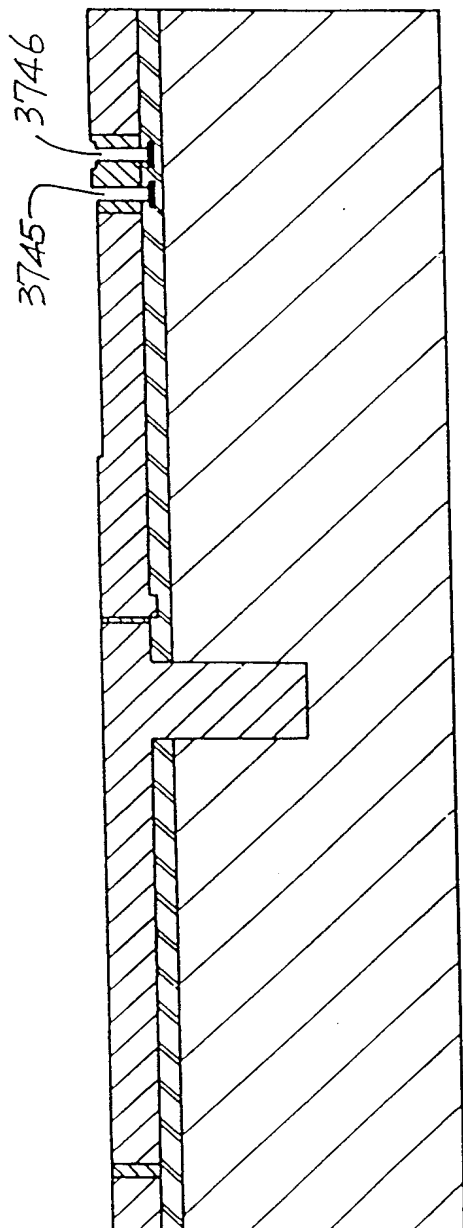


FIG. 462

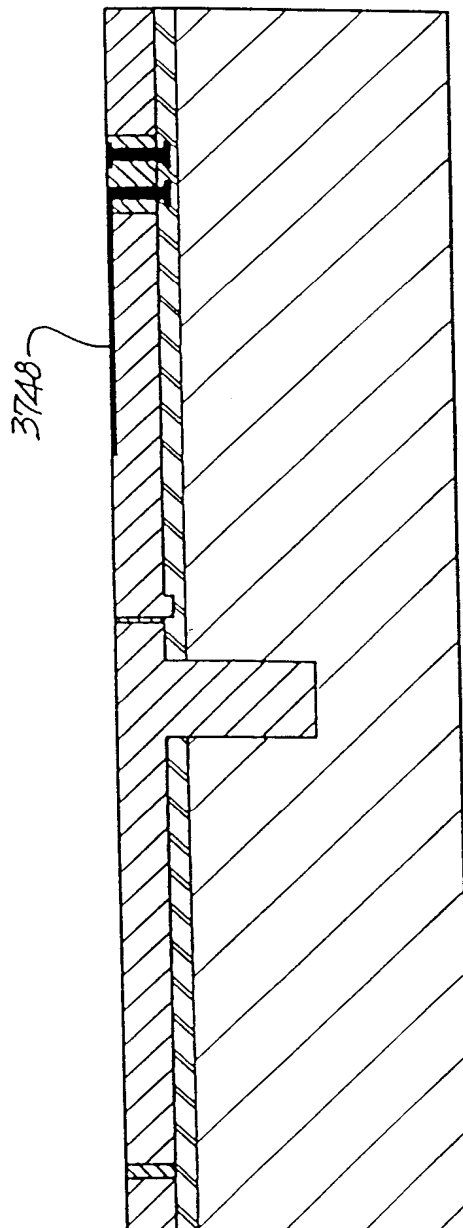


FIG. 463

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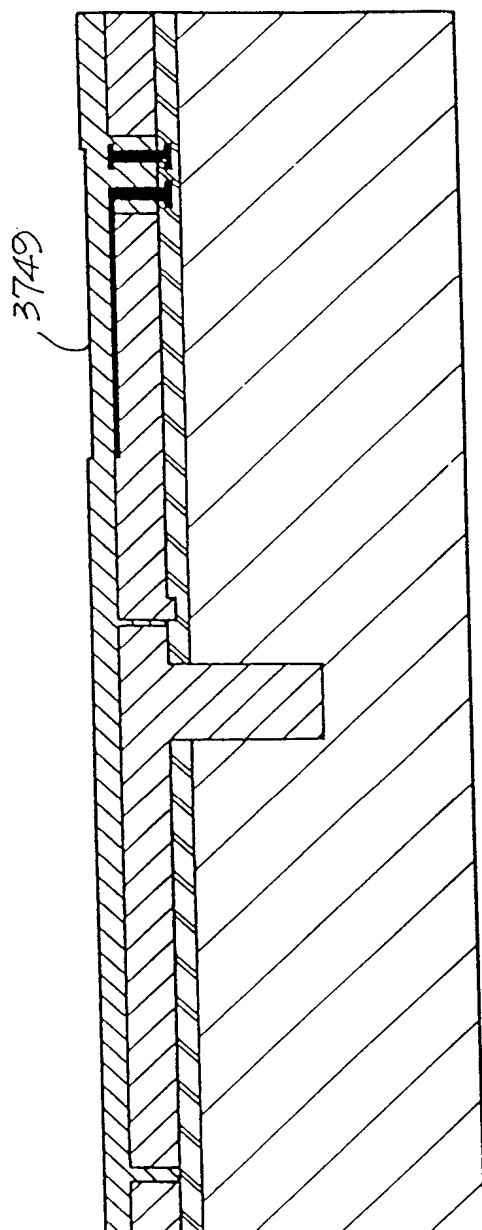


FIG. 464

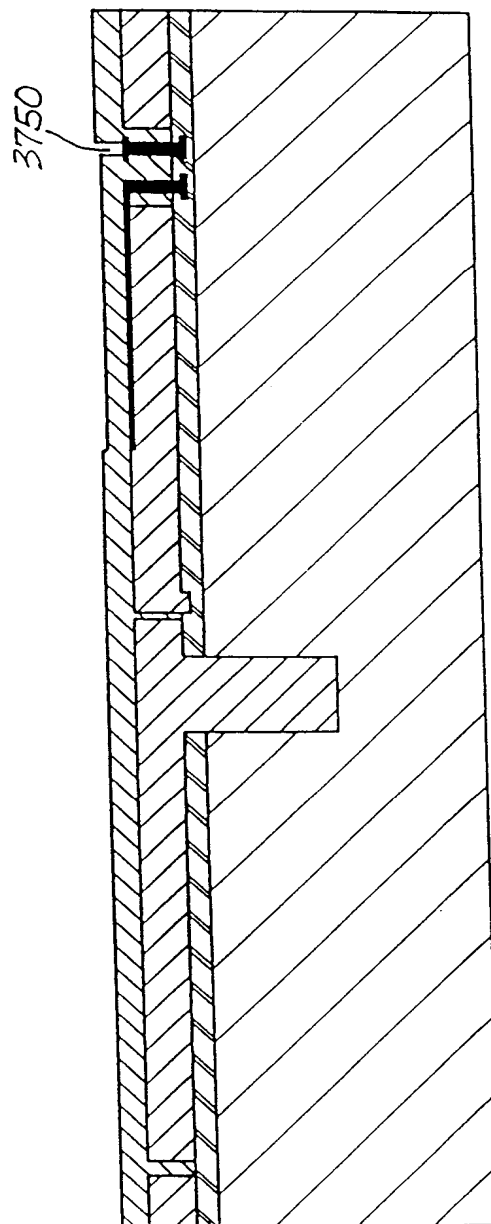


FIG. 465

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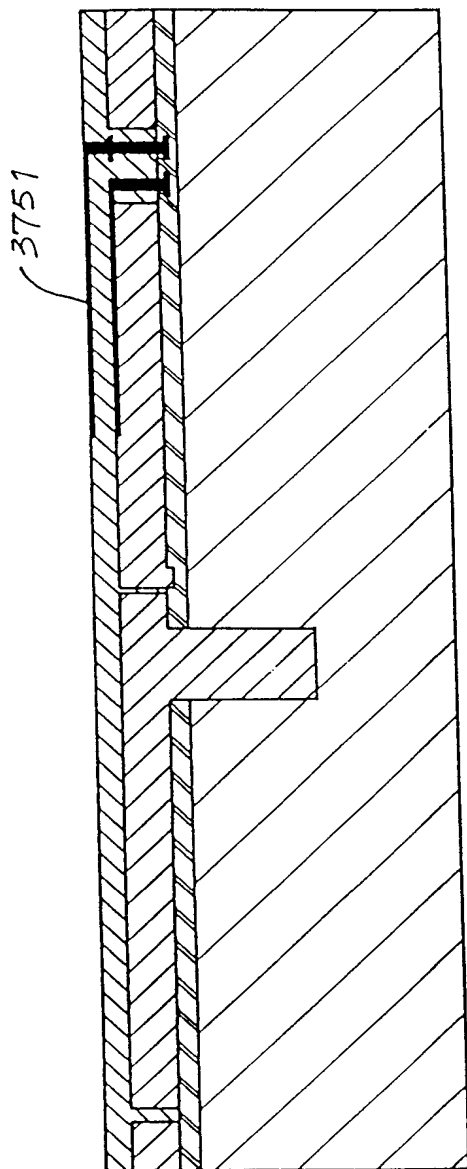


FIG. 466

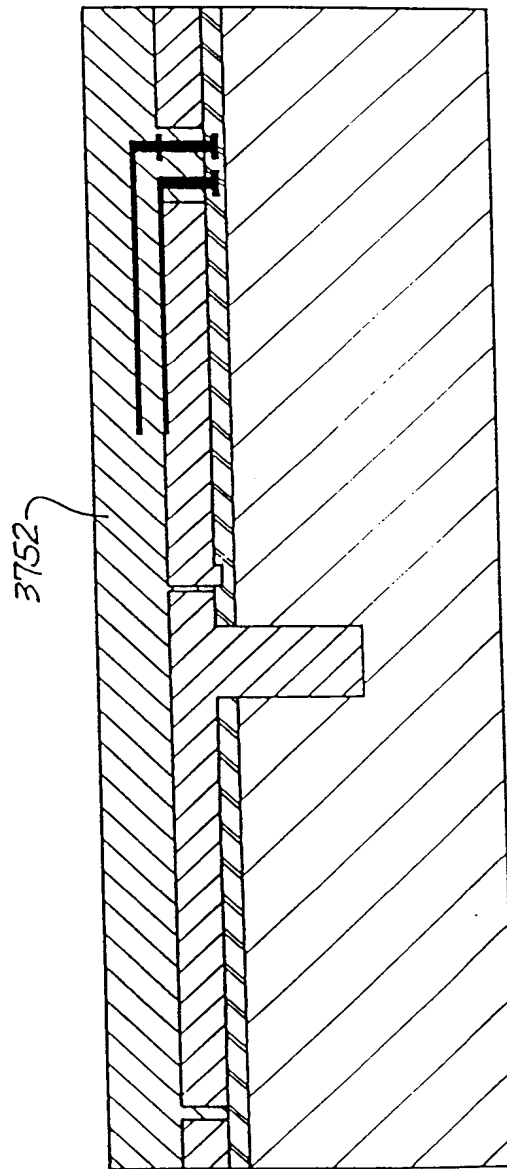


FIG. 467

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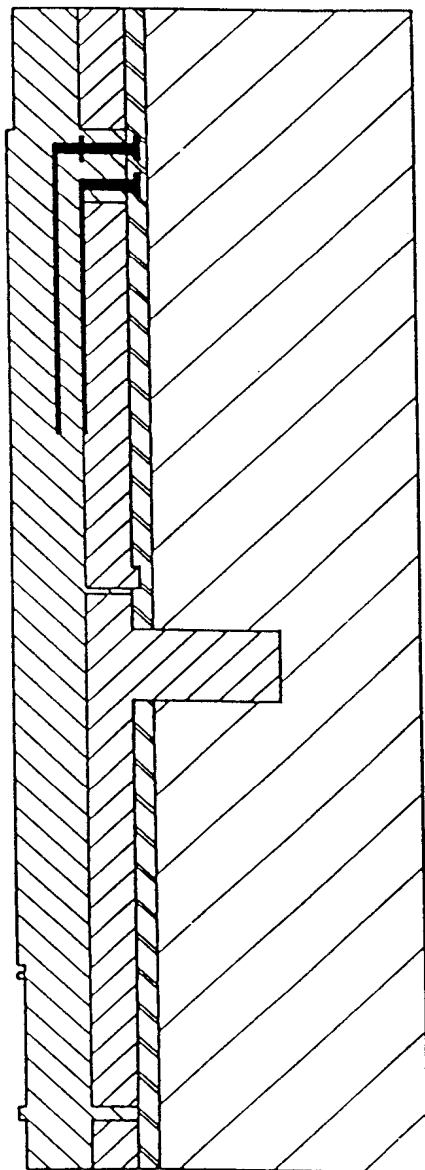


FIG. 468

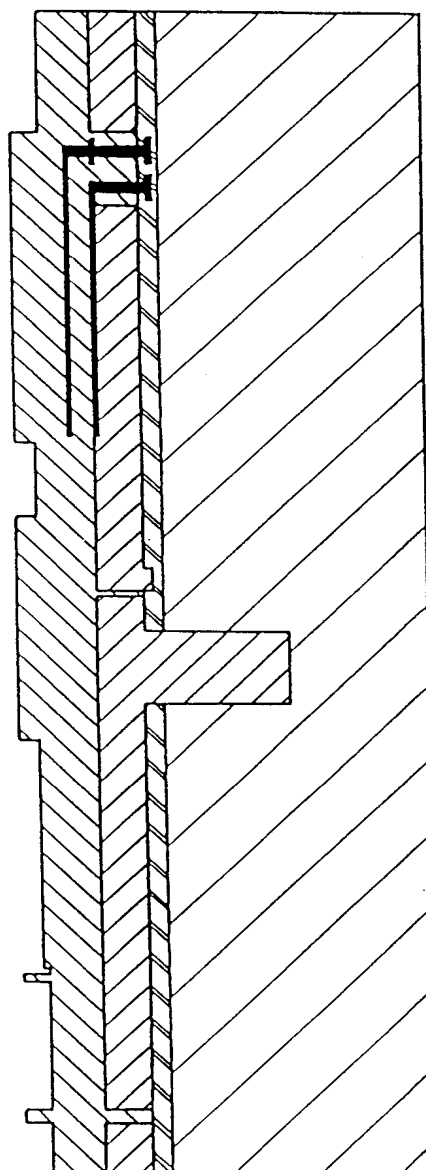


FIG. 469

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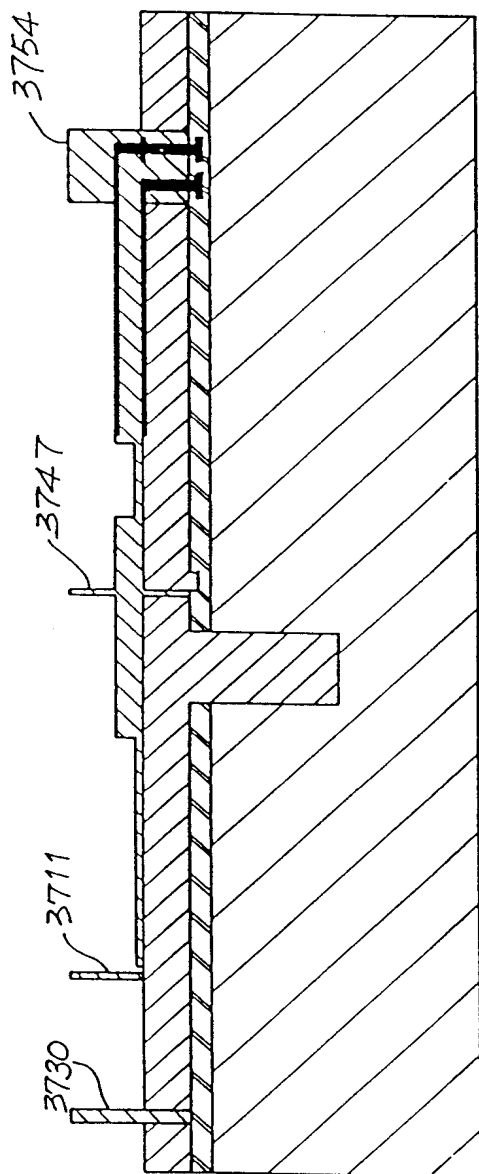


FIG. 470

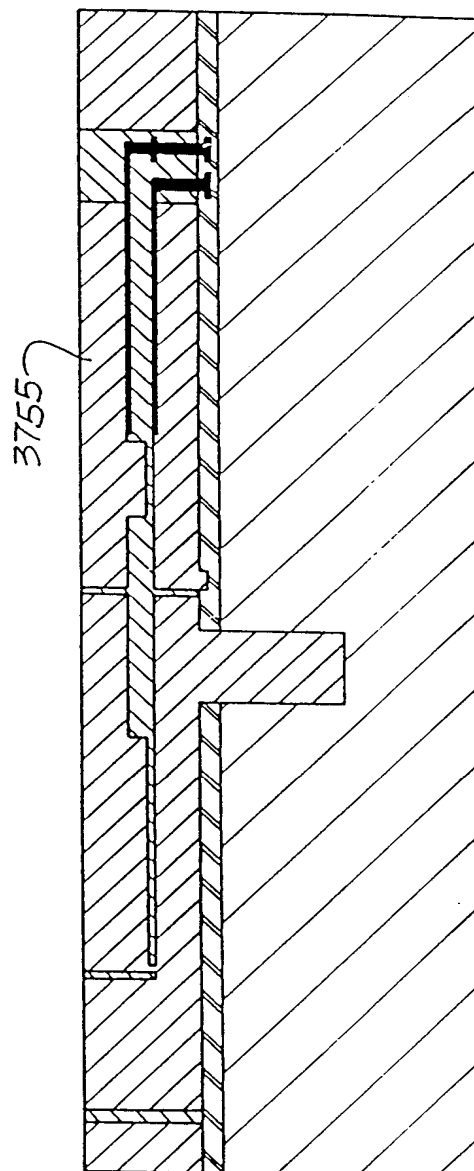


FIG. 471

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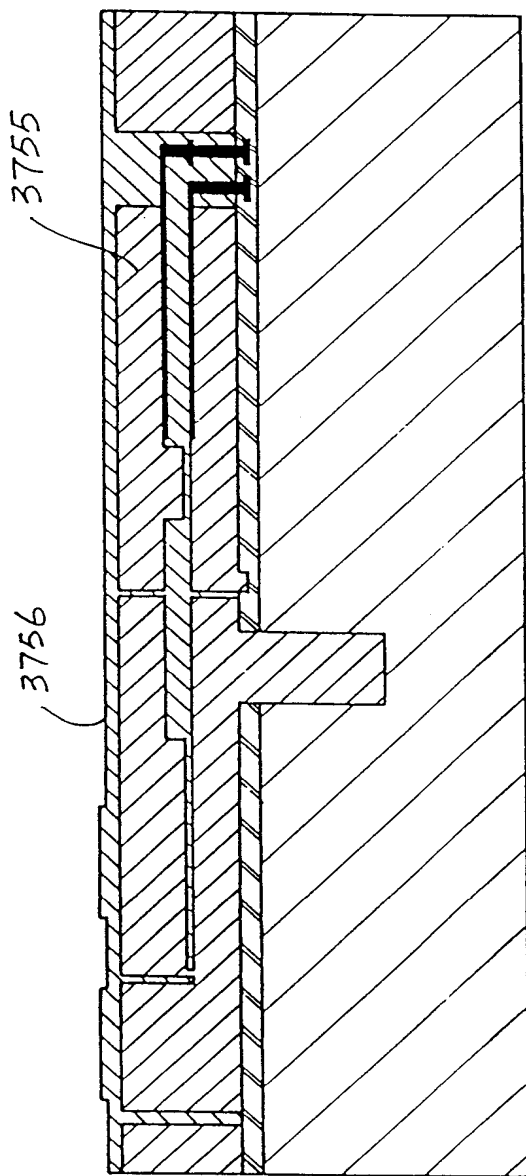


FIG. 472

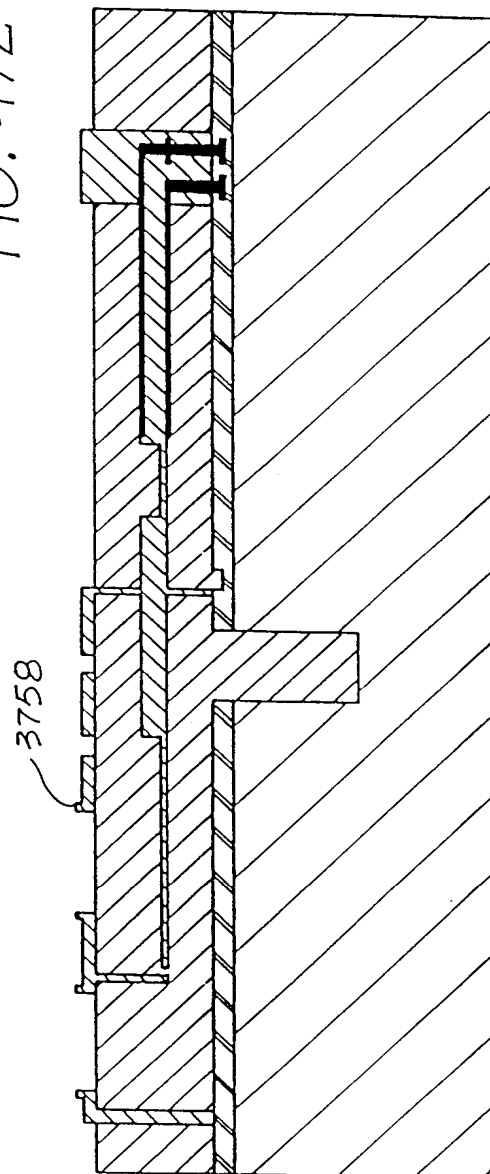


FIG. 473

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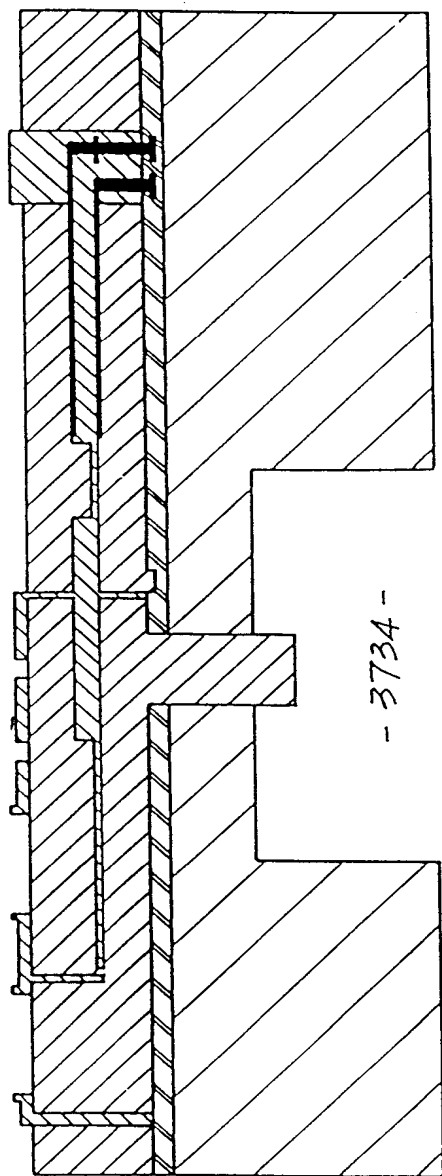


FIG. 474

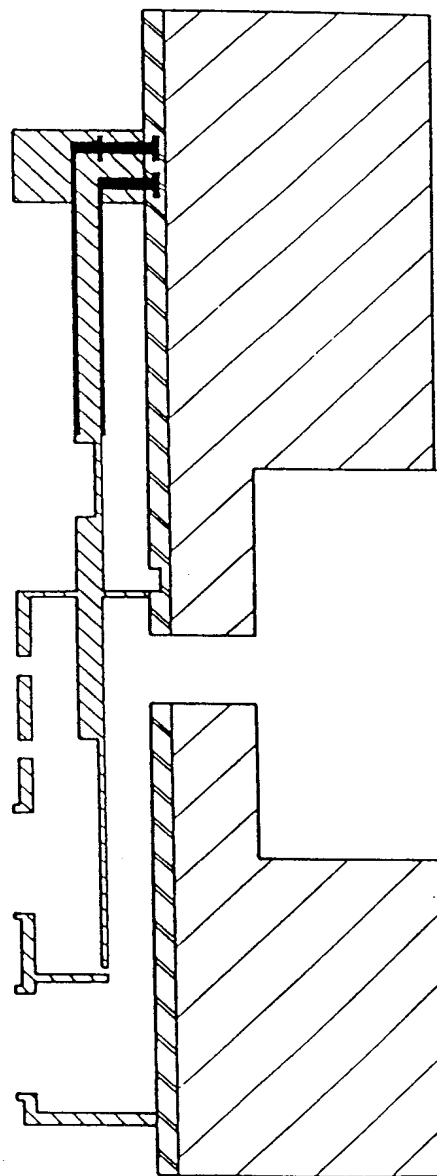


FIG. 475

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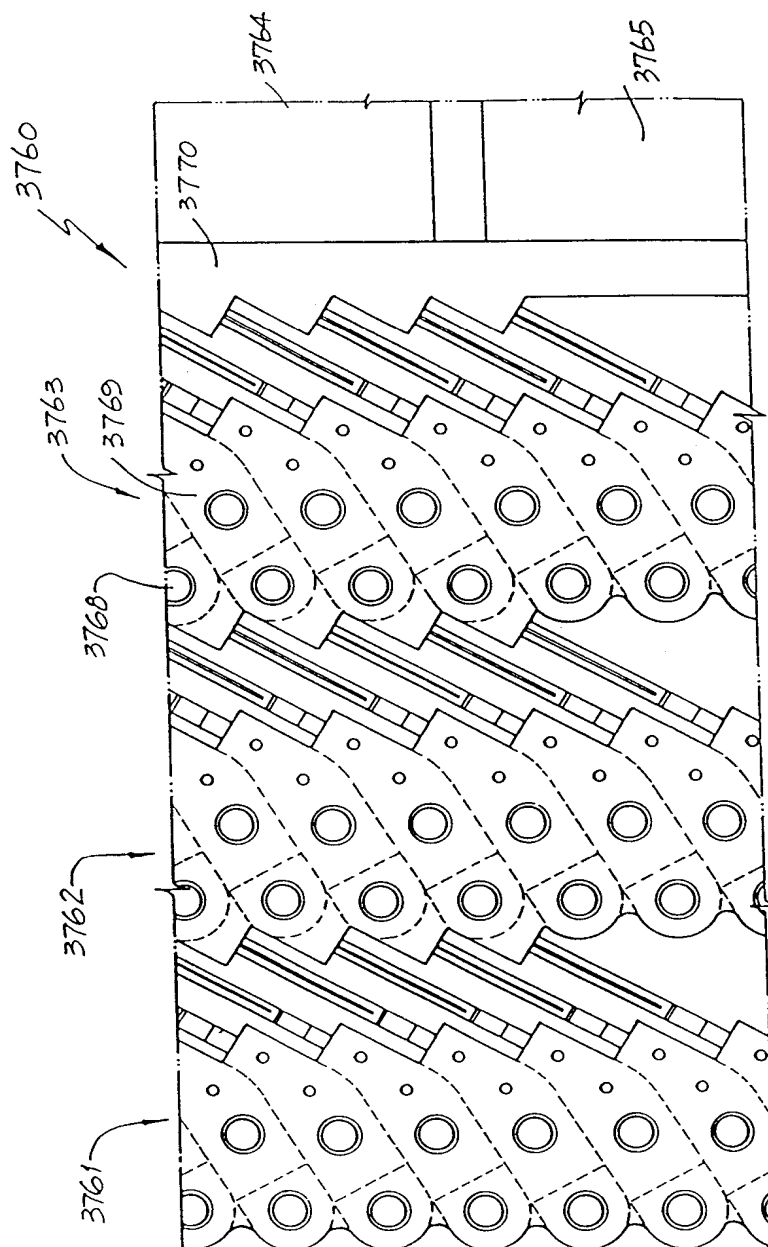
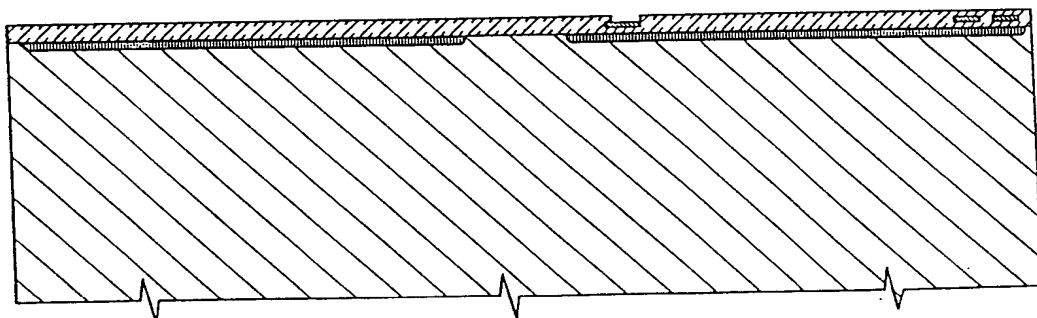
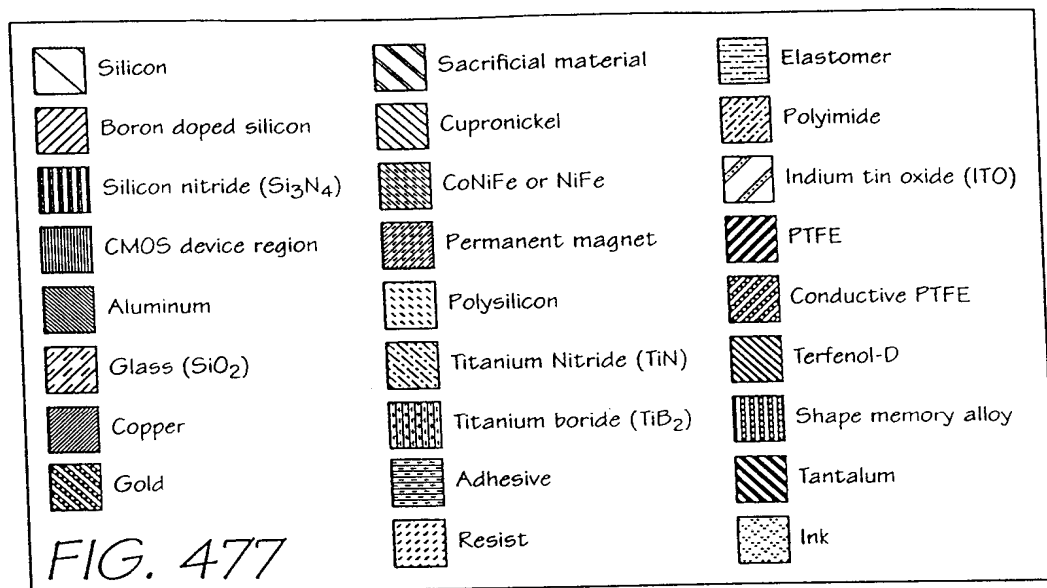
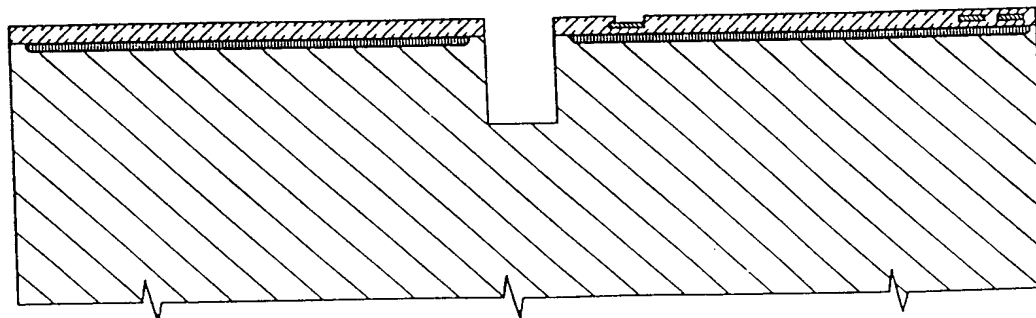


FIG. 476

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*FIG. 478**FIG. 479*

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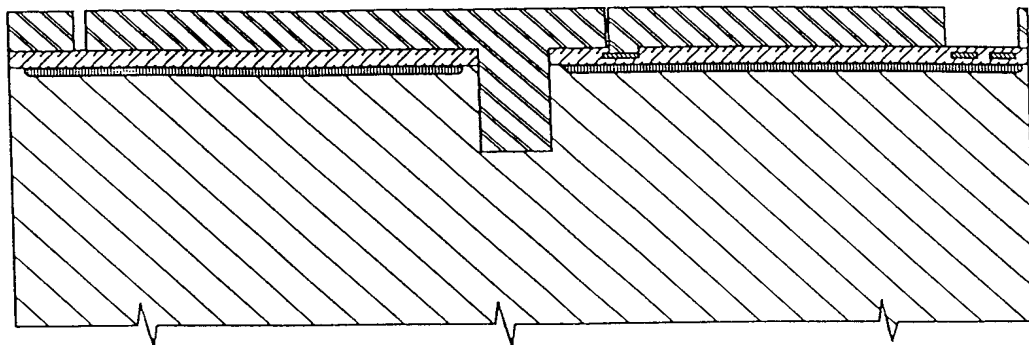


FIG. 480

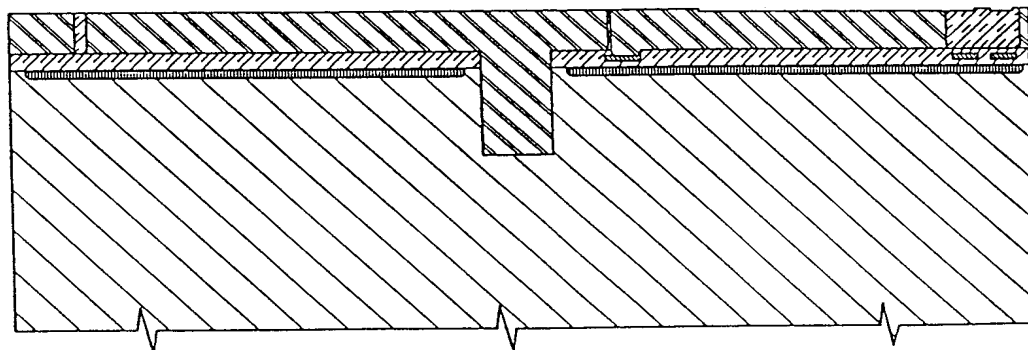


FIG. 481

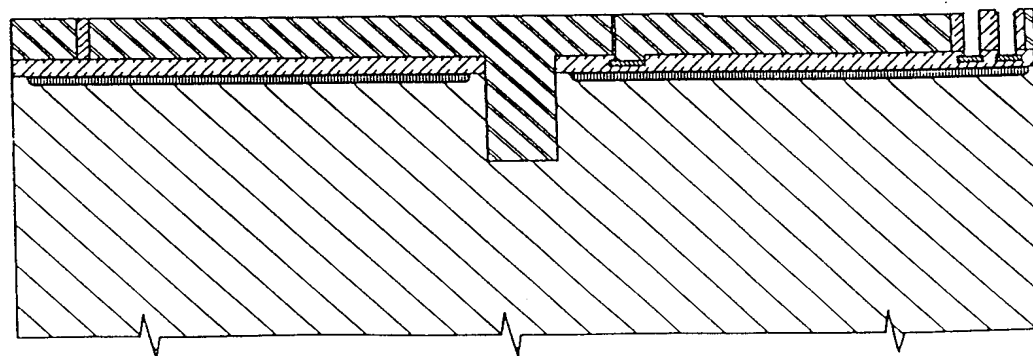


FIG. 482

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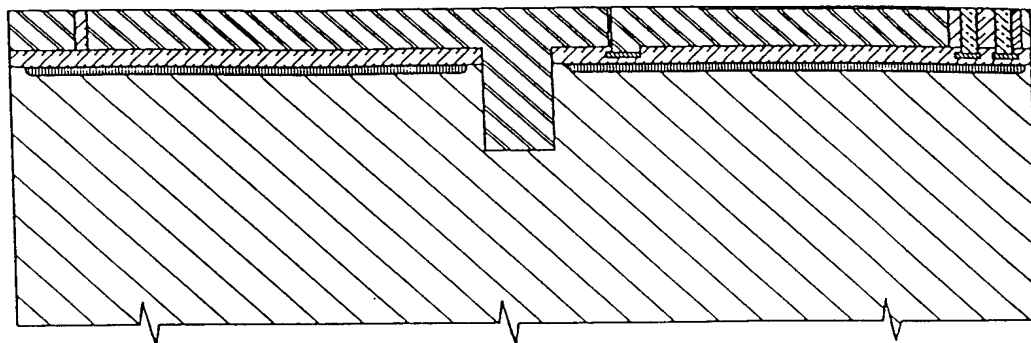


FIG. 483

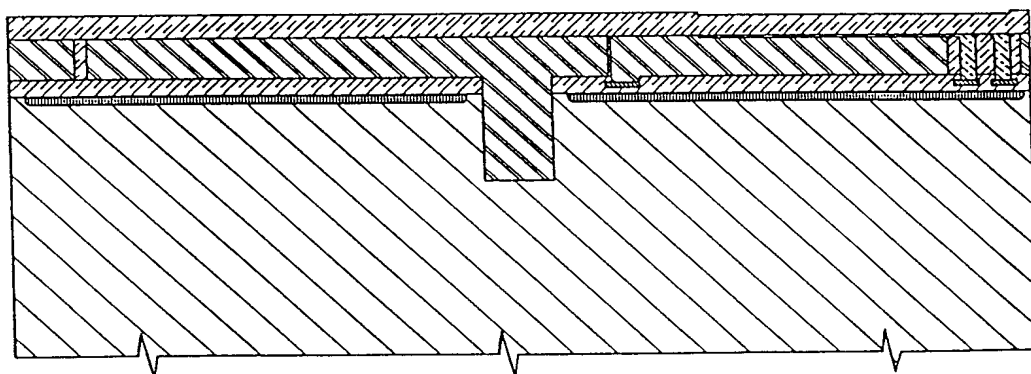


FIG. 484

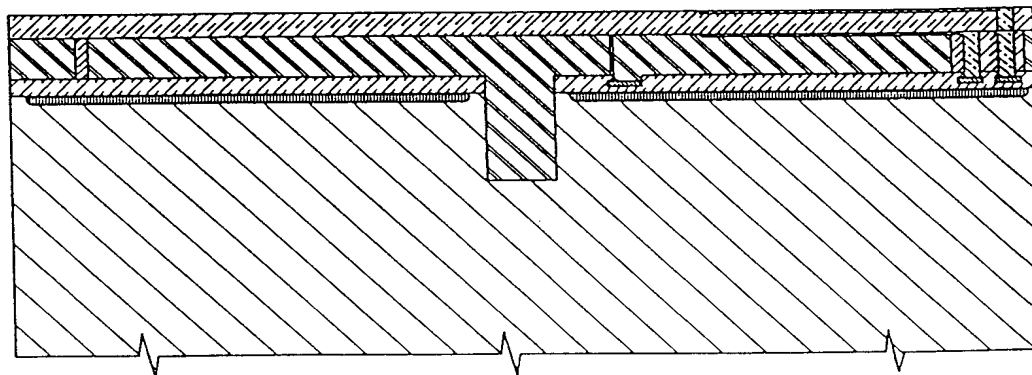


FIG. 485

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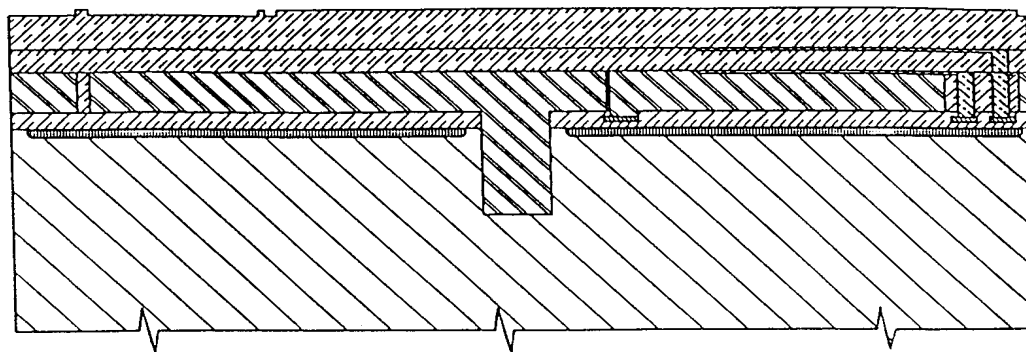


FIG. 486

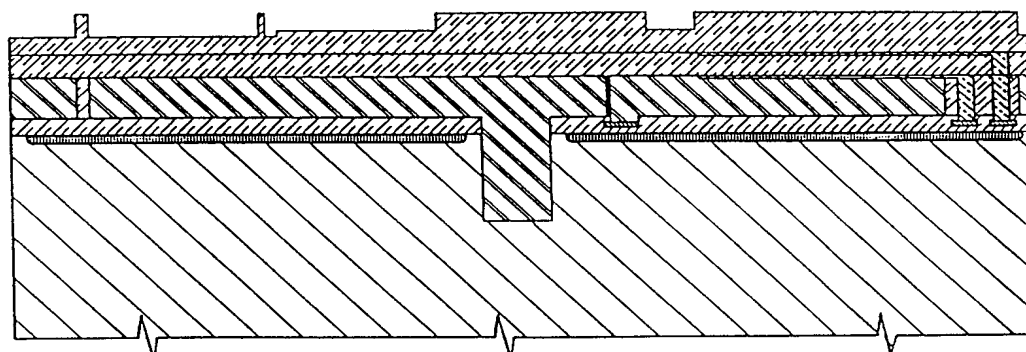


FIG. 487

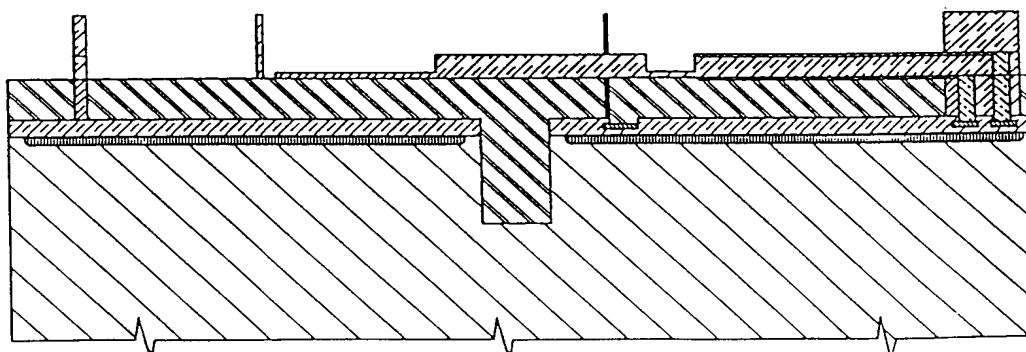


FIG. 488

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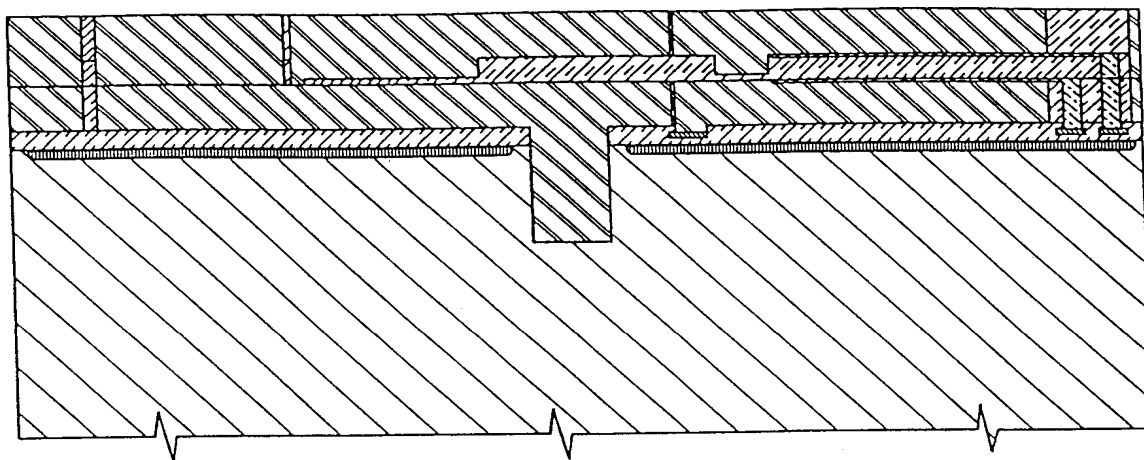


FIG. 489

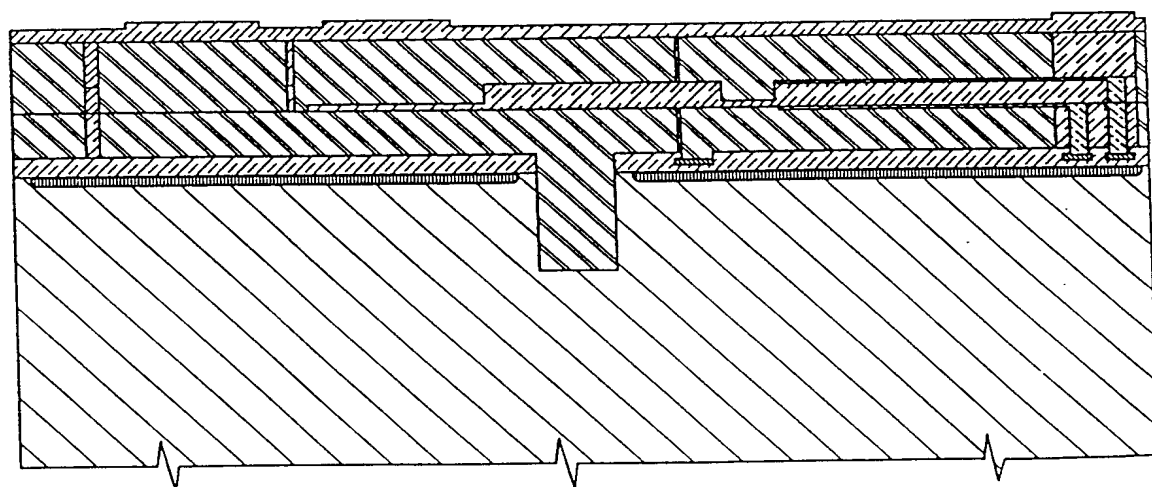


FIG. 490

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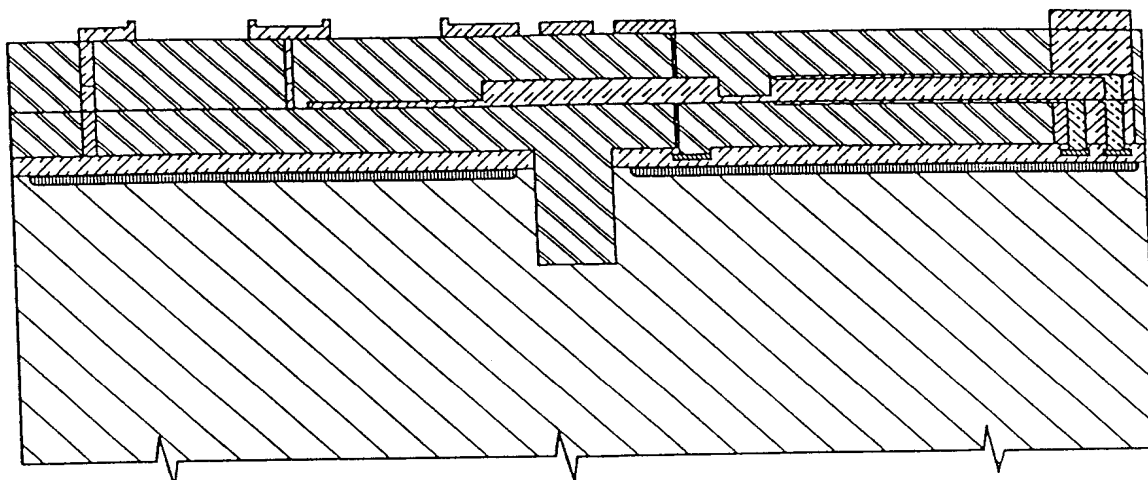


FIG. 491

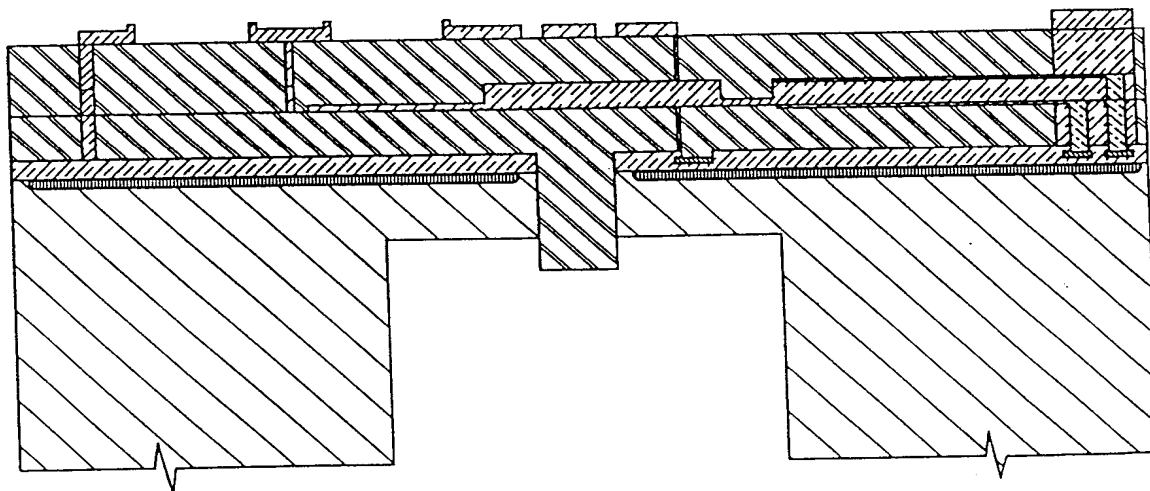


FIG. 492

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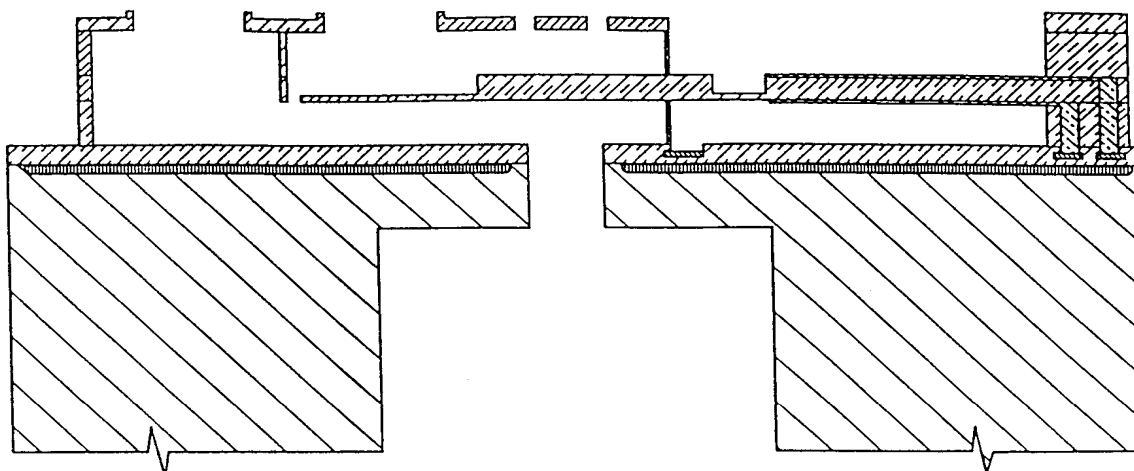


FIG. 493

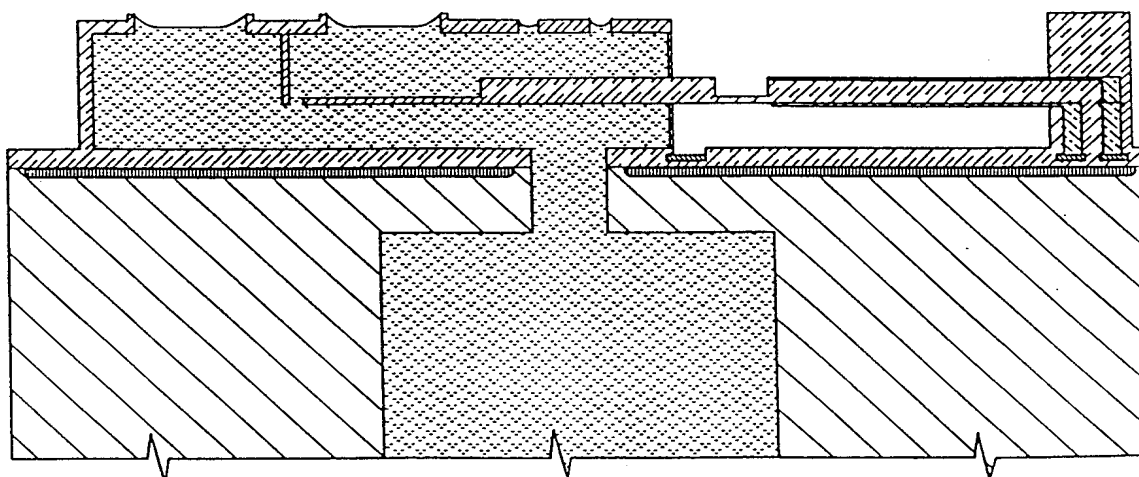


FIG. 494

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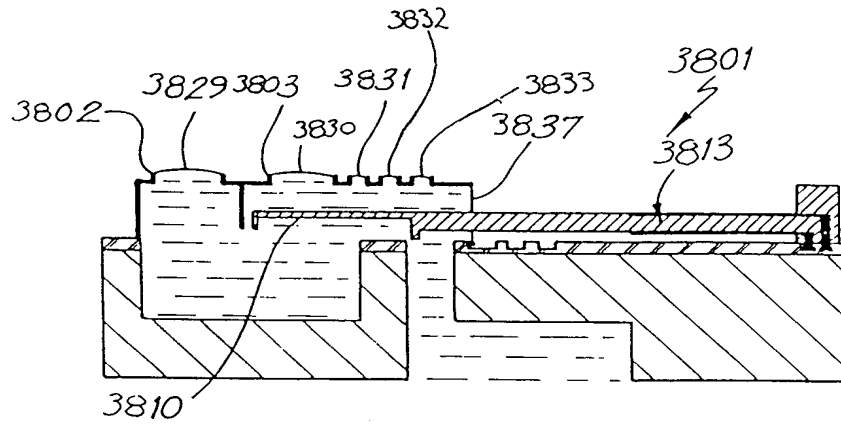


FIG. 495

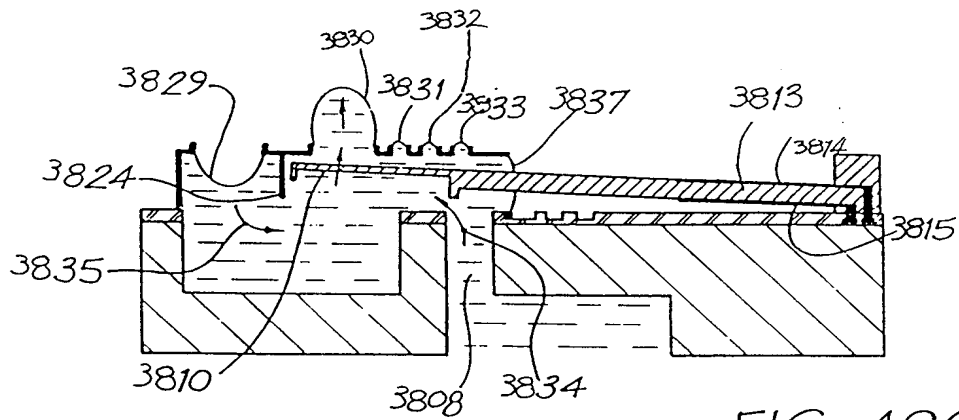


FIG. 496

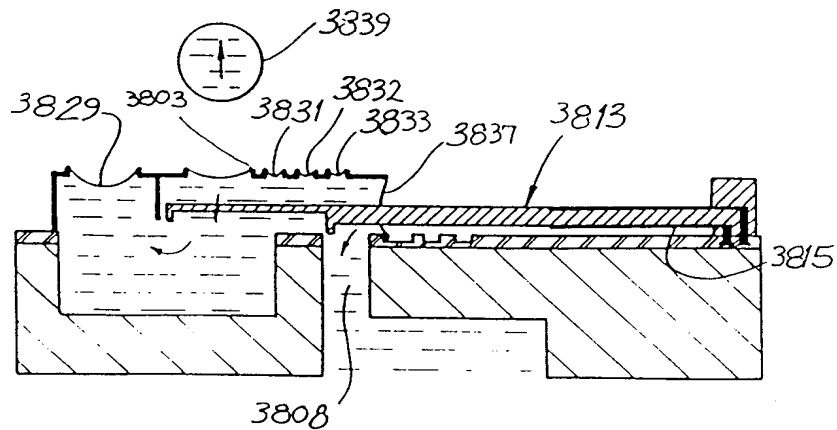


FIG. 497

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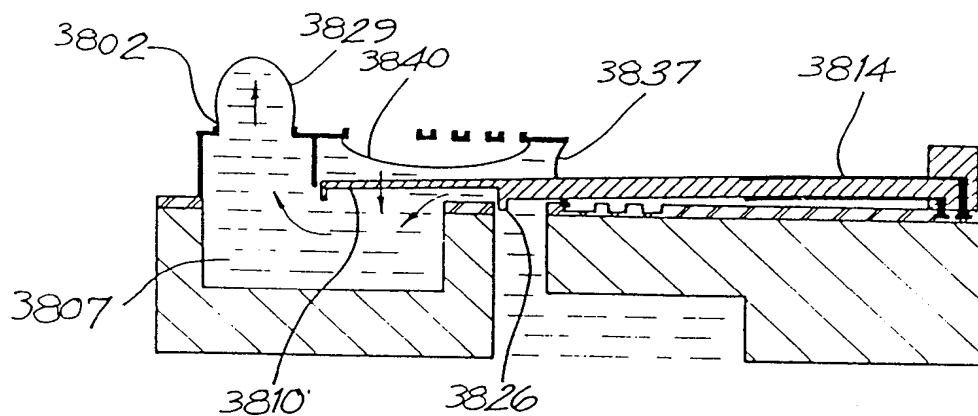


FIG. 498

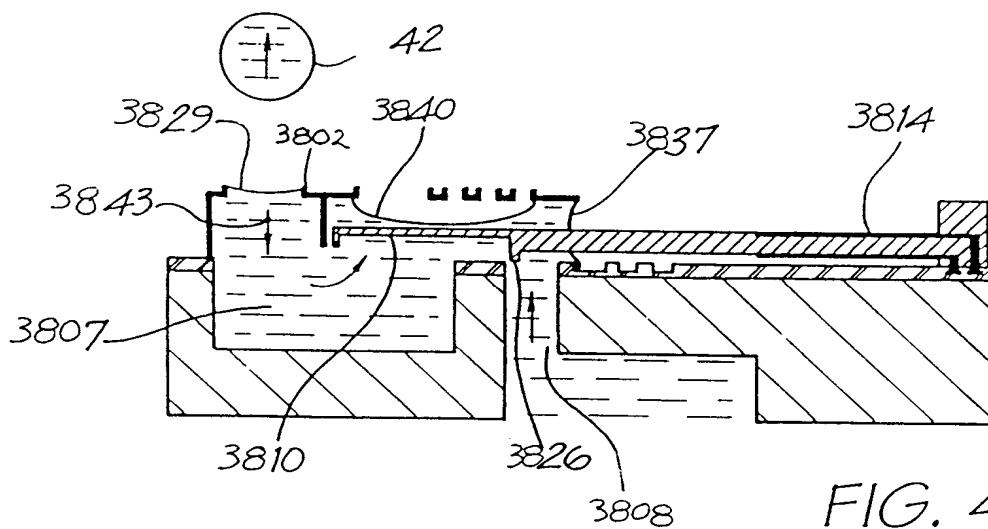


FIG. 499

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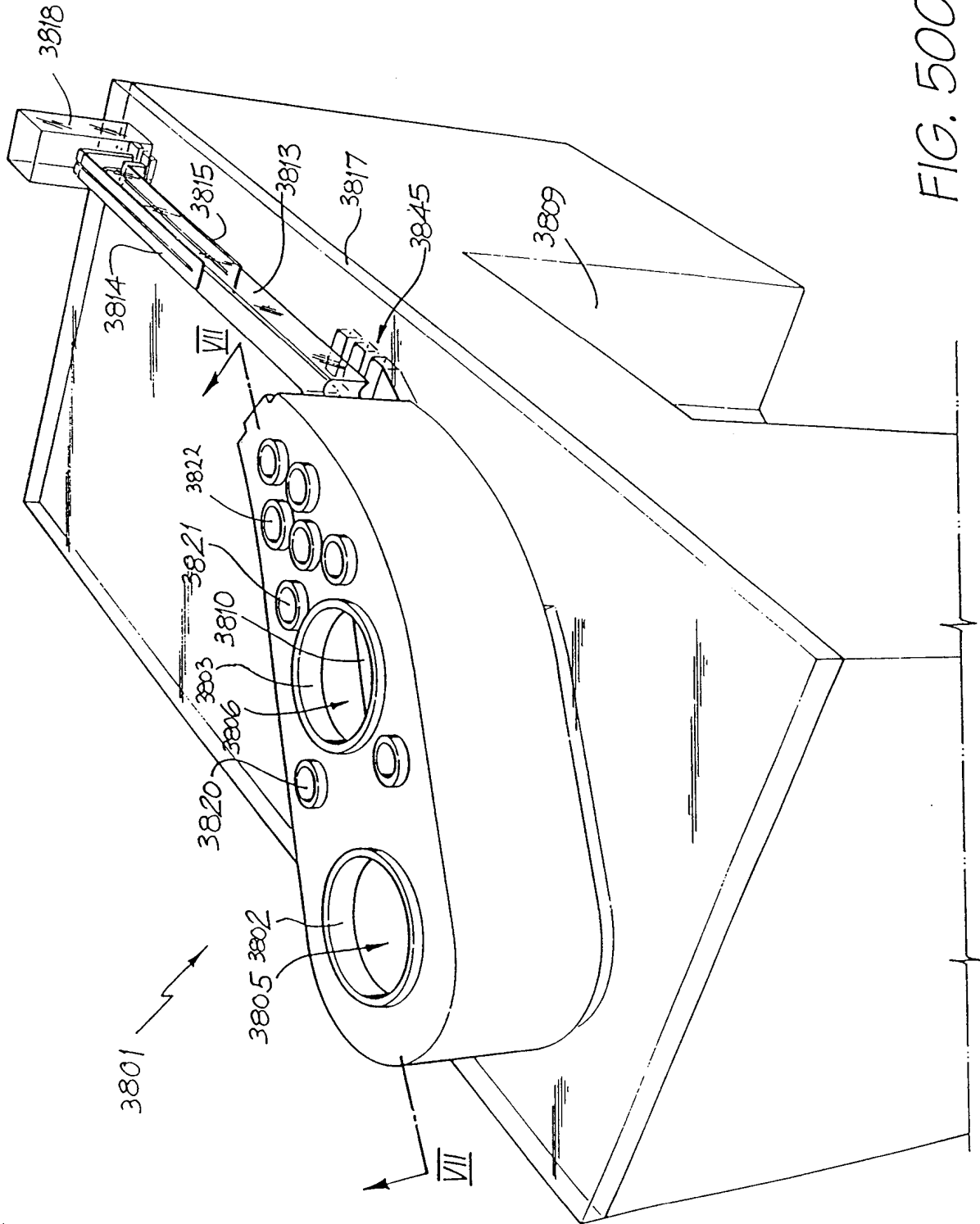


FIG. 500

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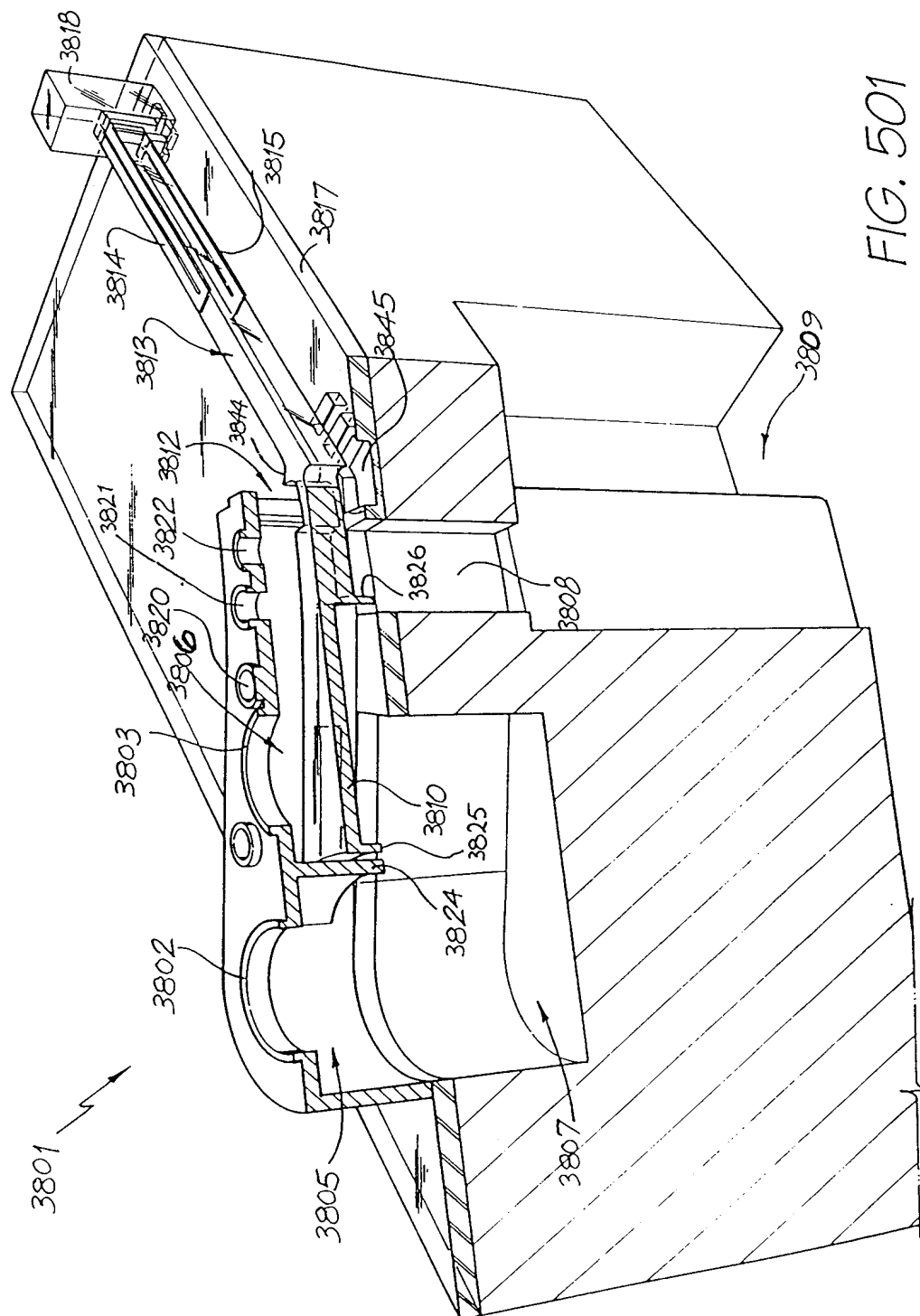
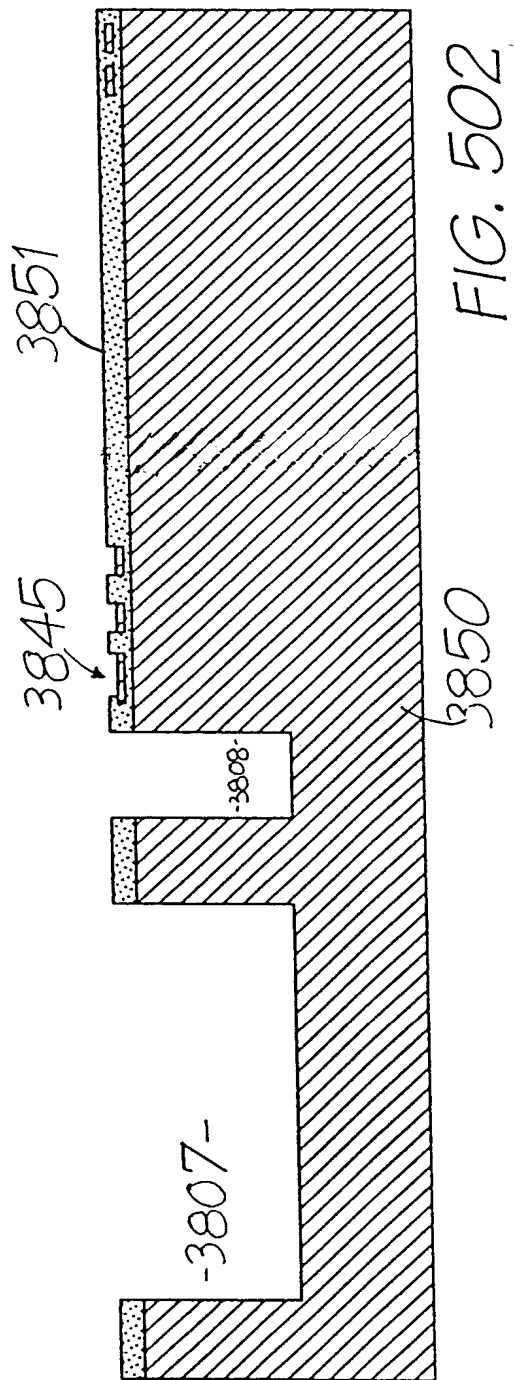
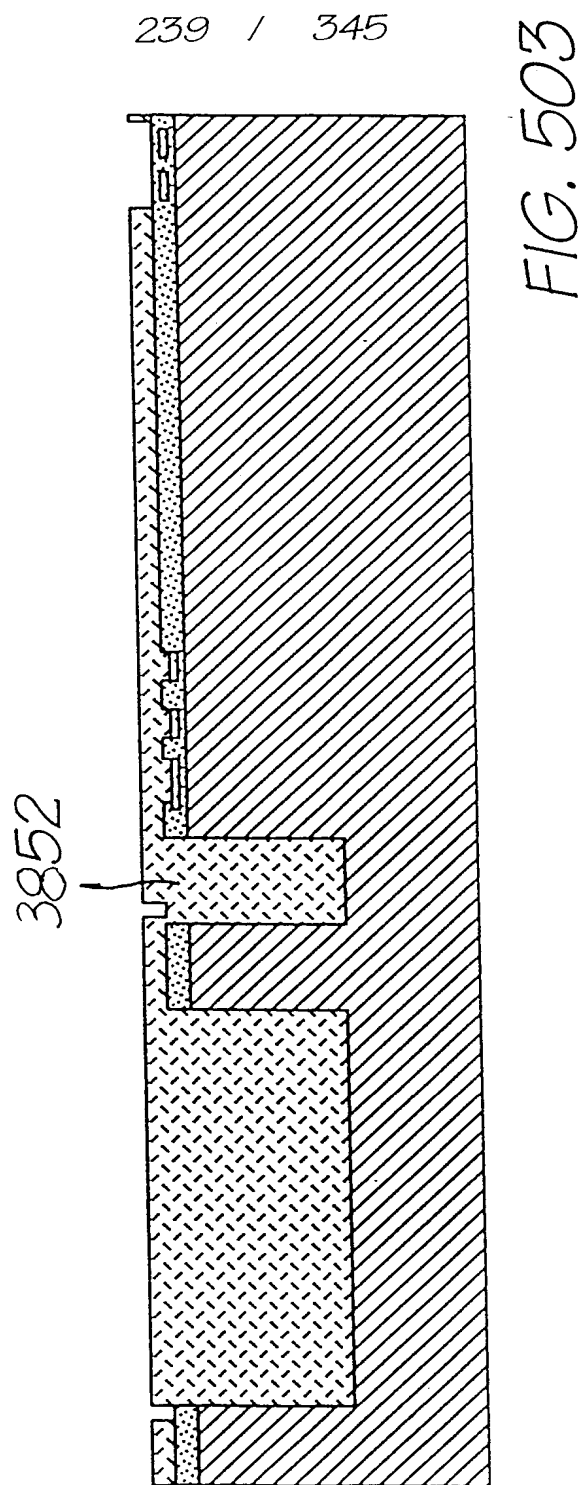
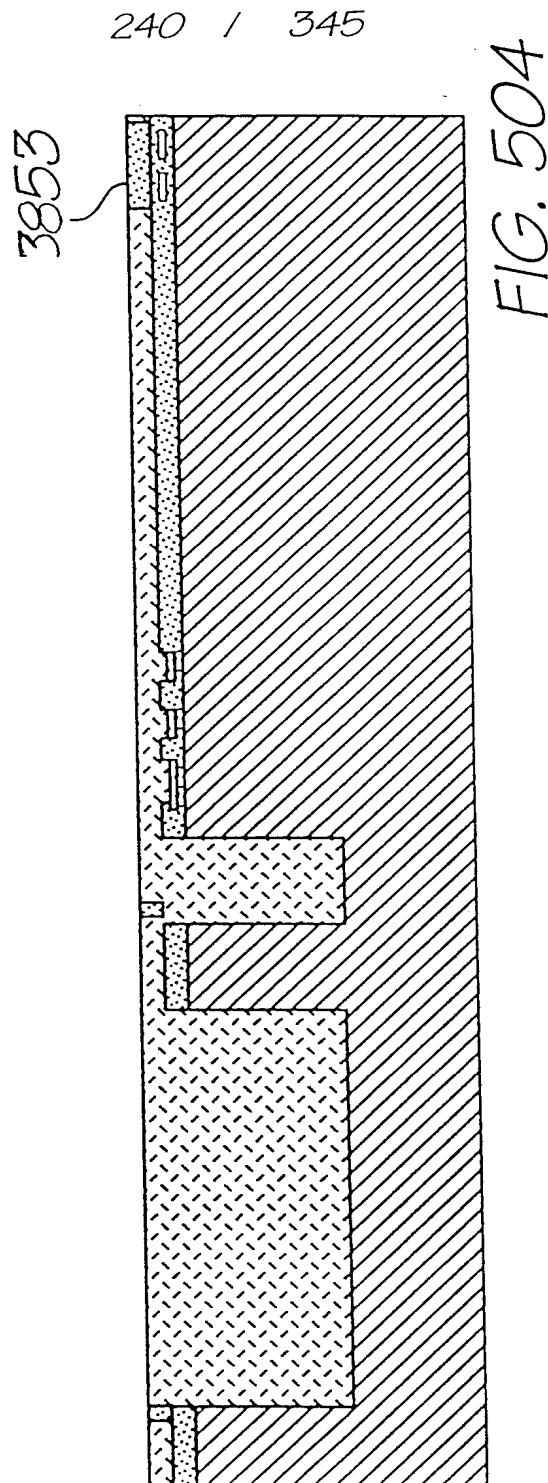


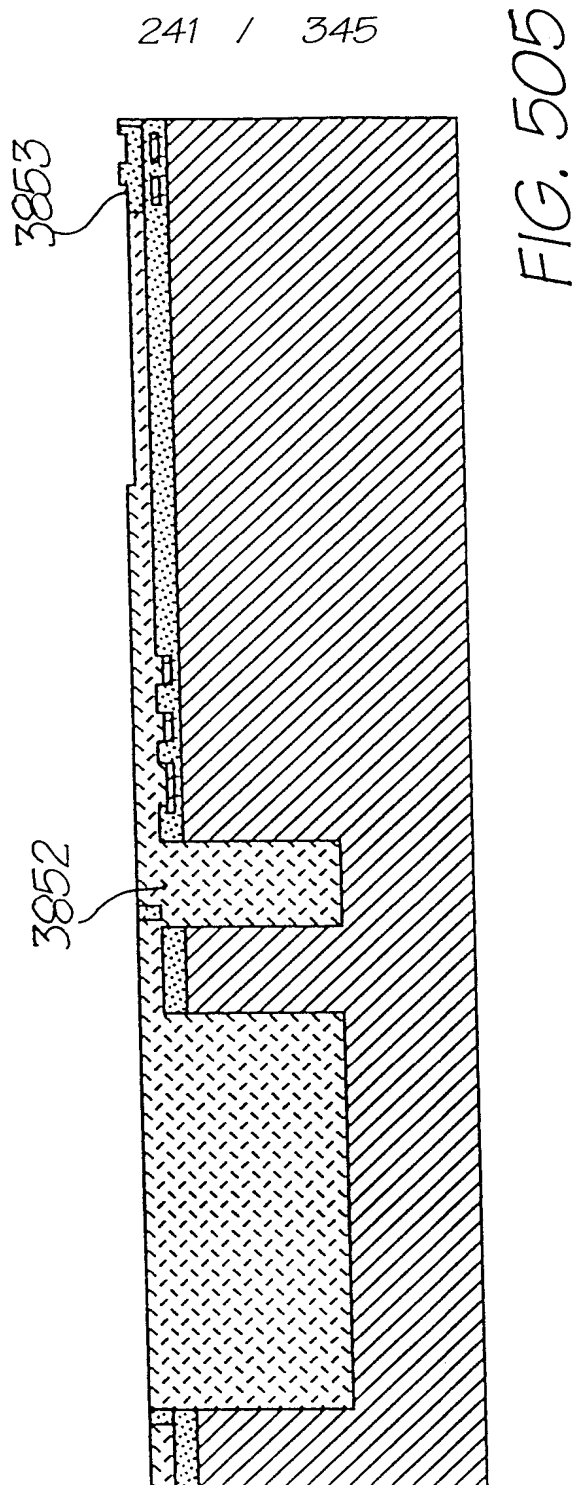
FIG. 501

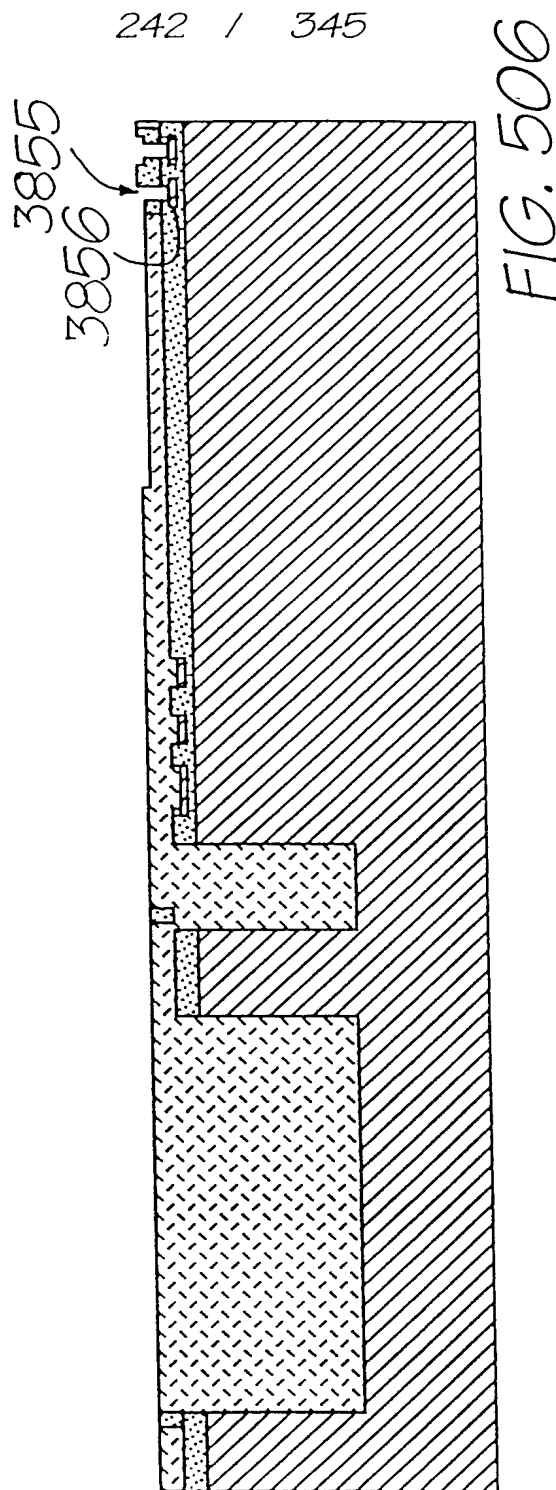
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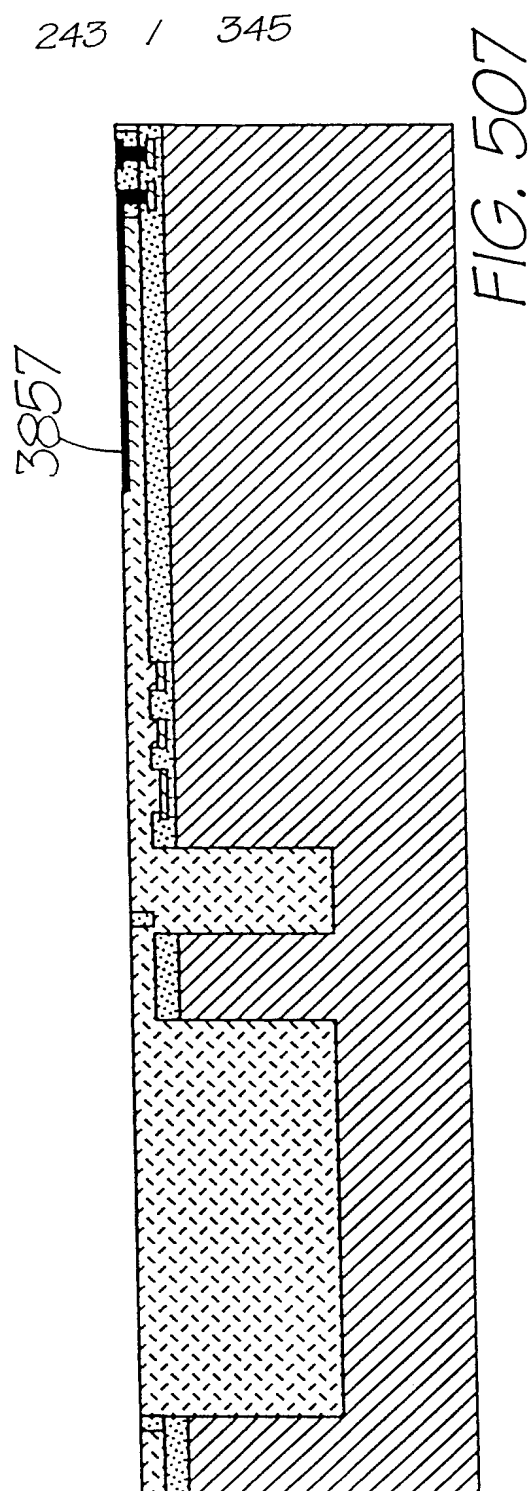












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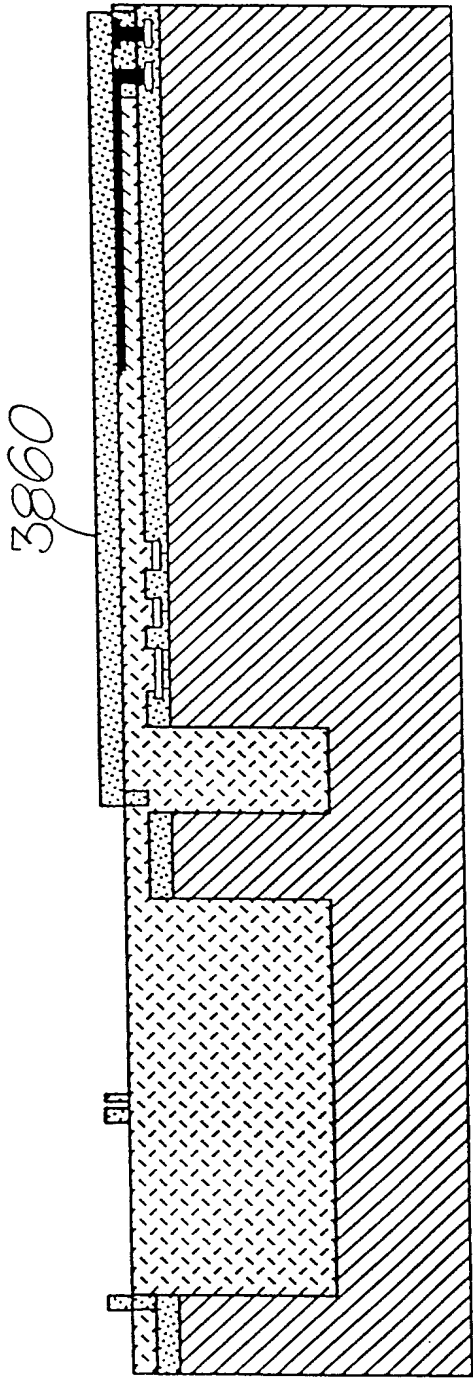


FIG. 508

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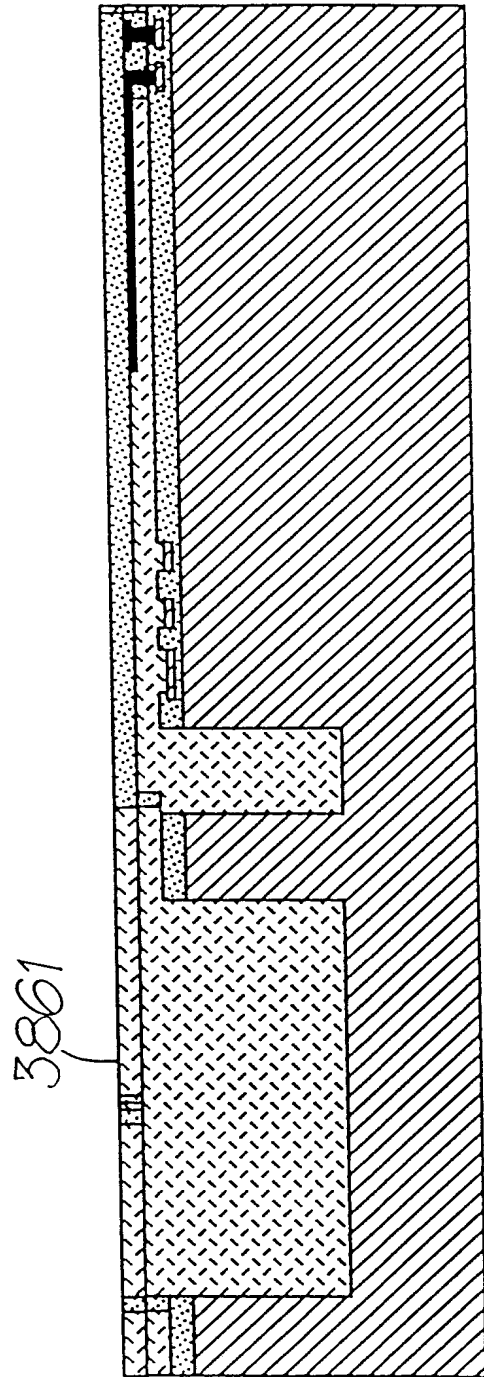


FIG. 509

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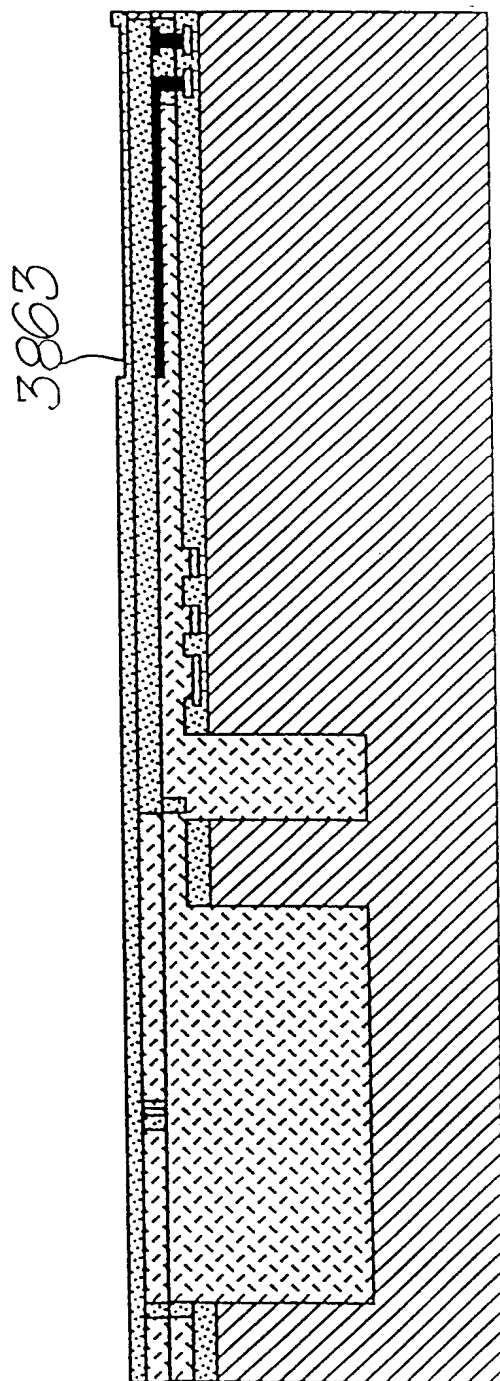


FIG. 510

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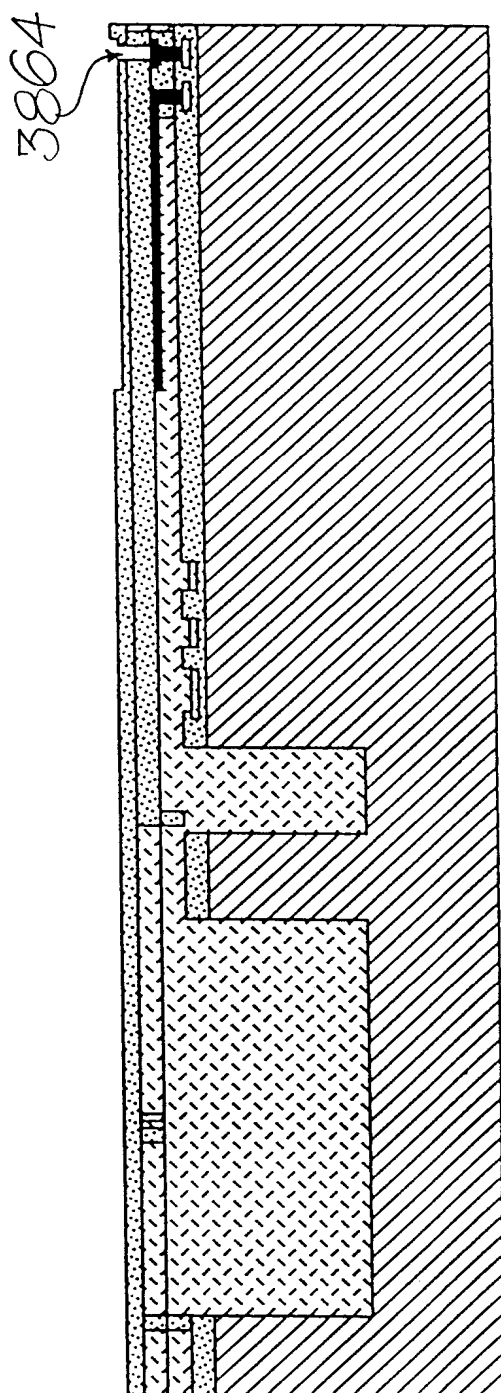


FIG. 511

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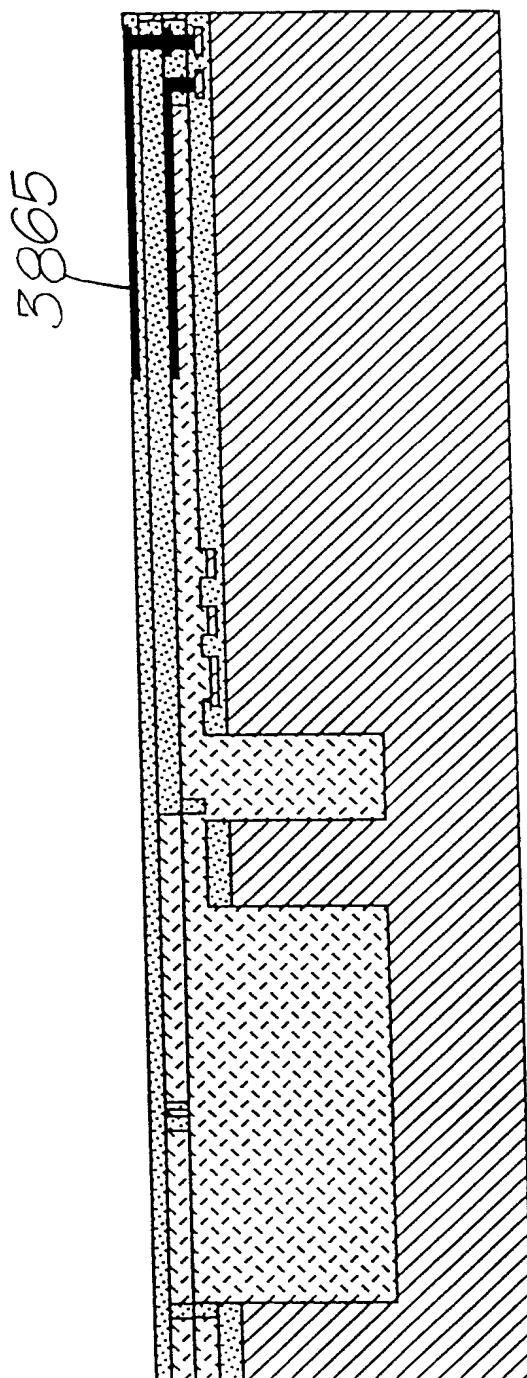
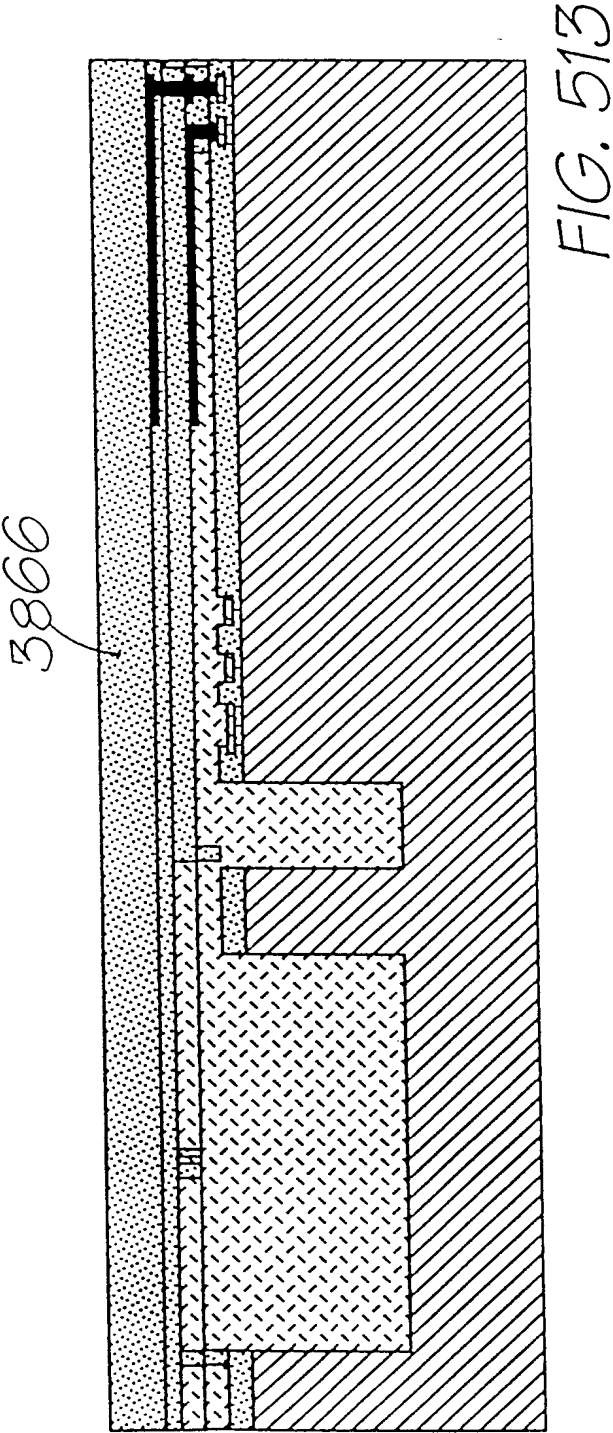


FIG. 512

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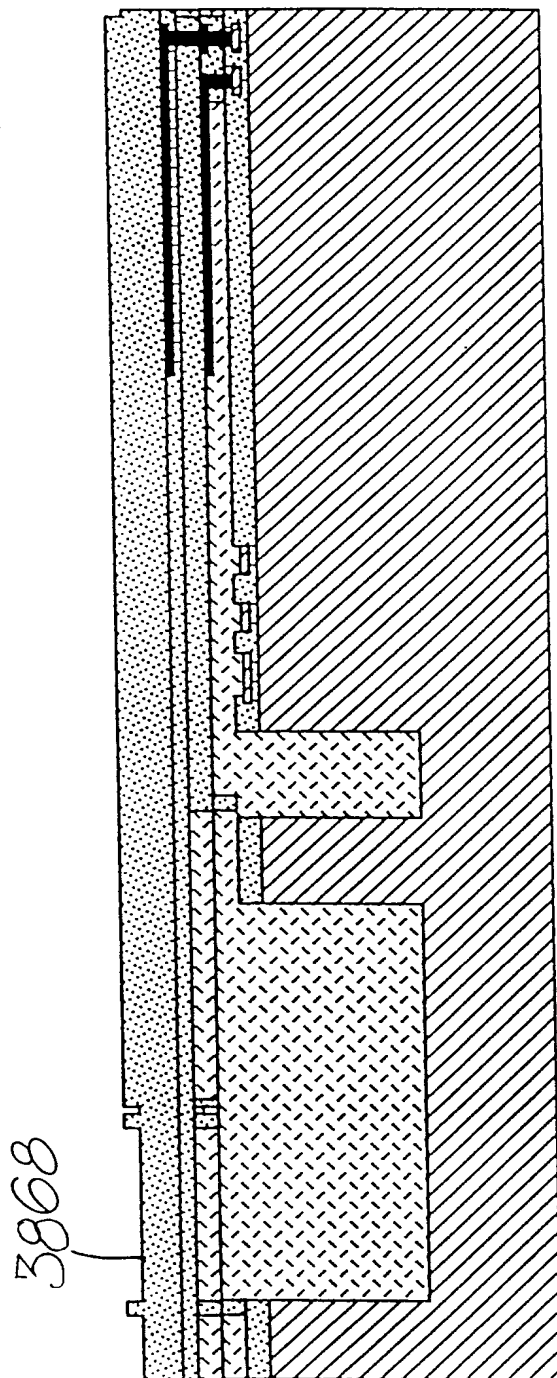
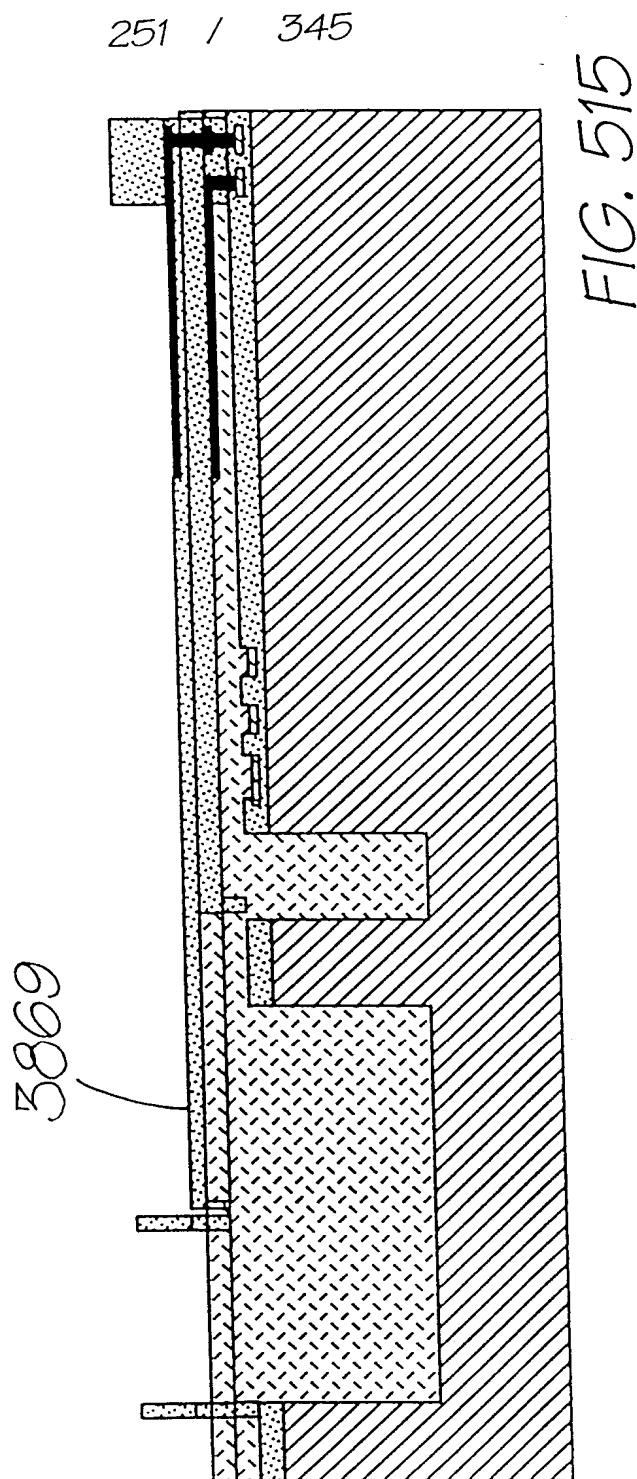
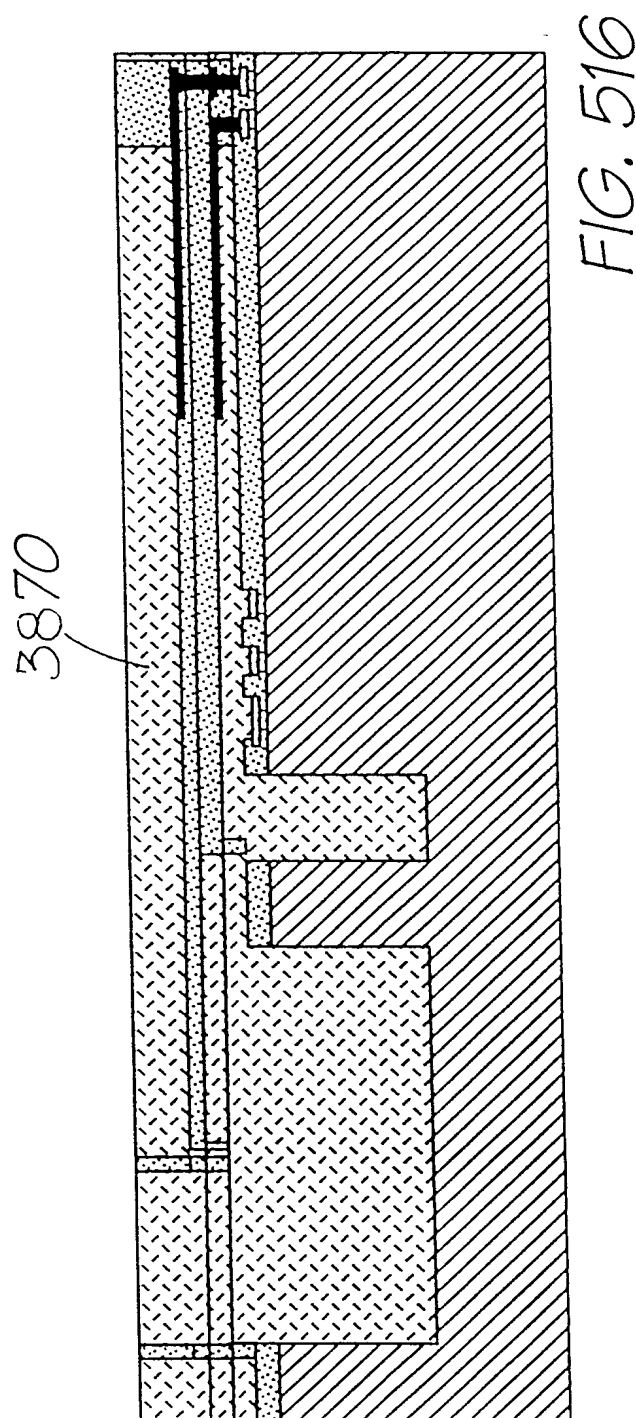


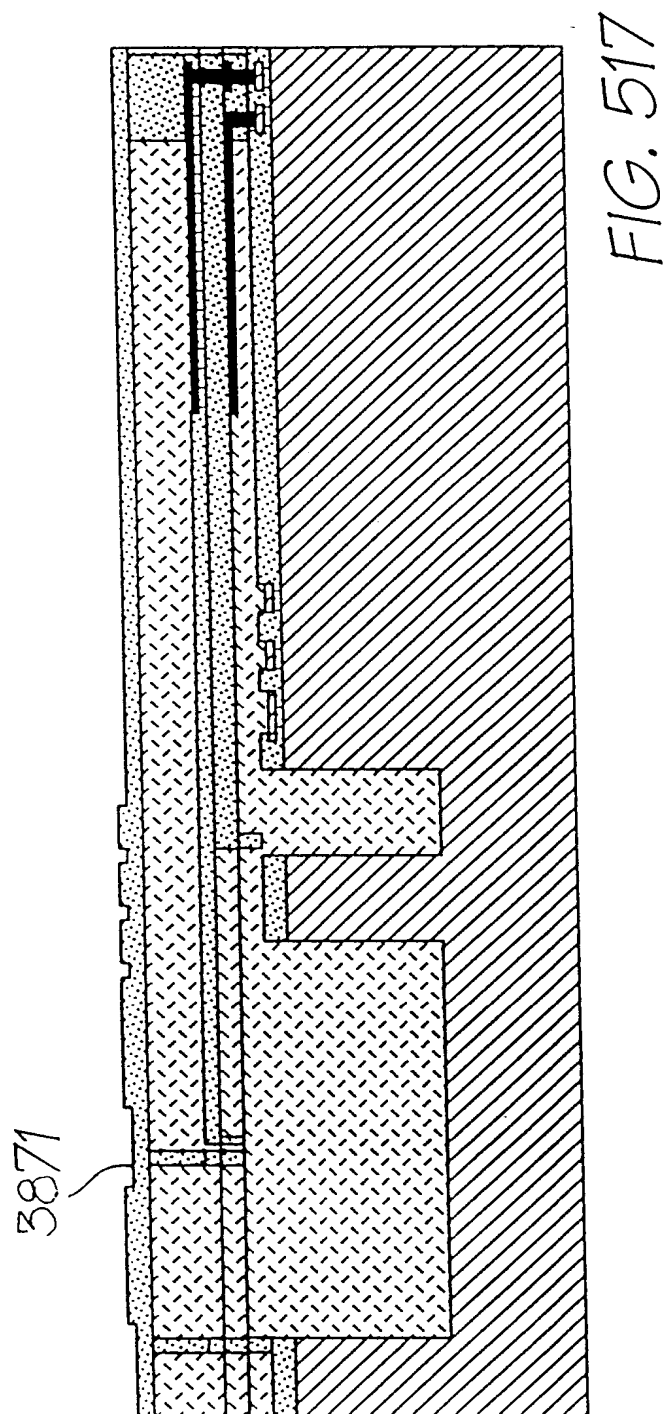
FIG. 514



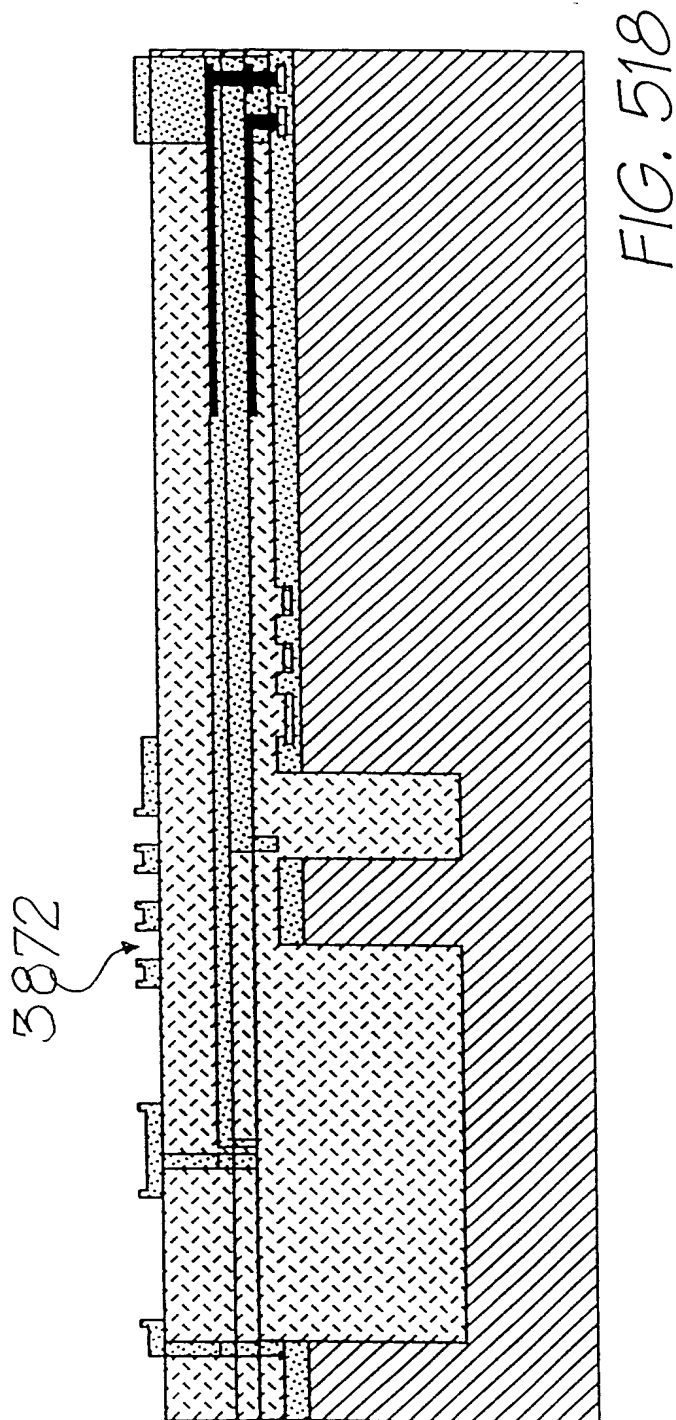
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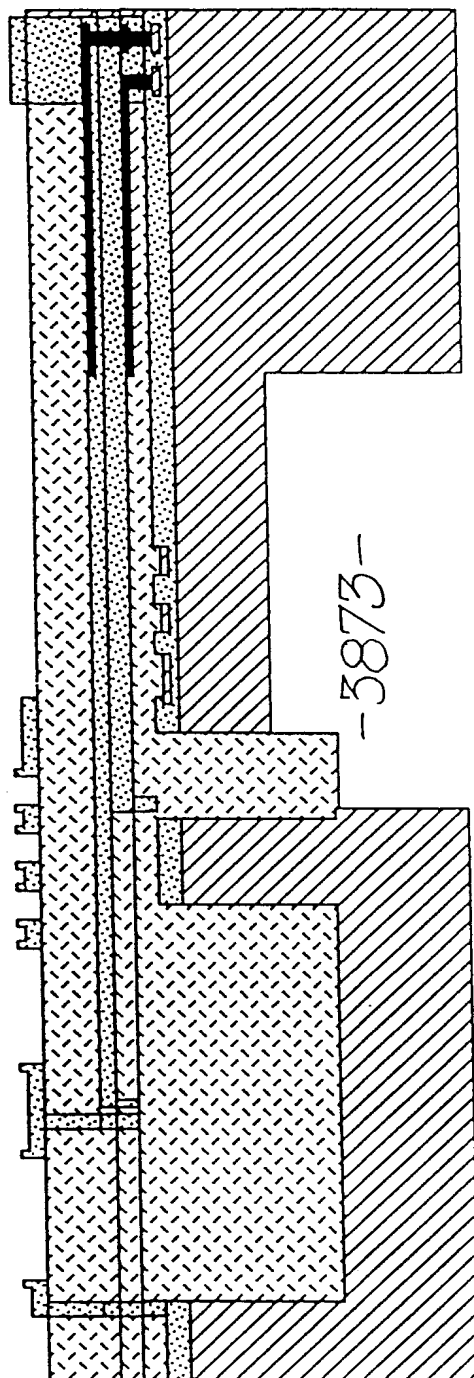
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FIG. 519

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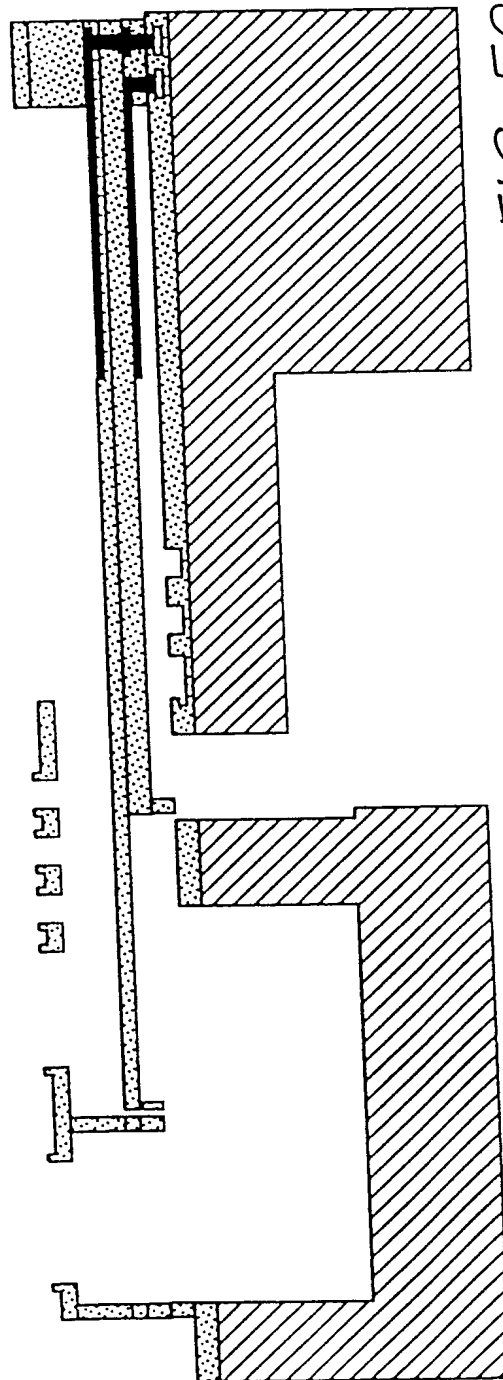
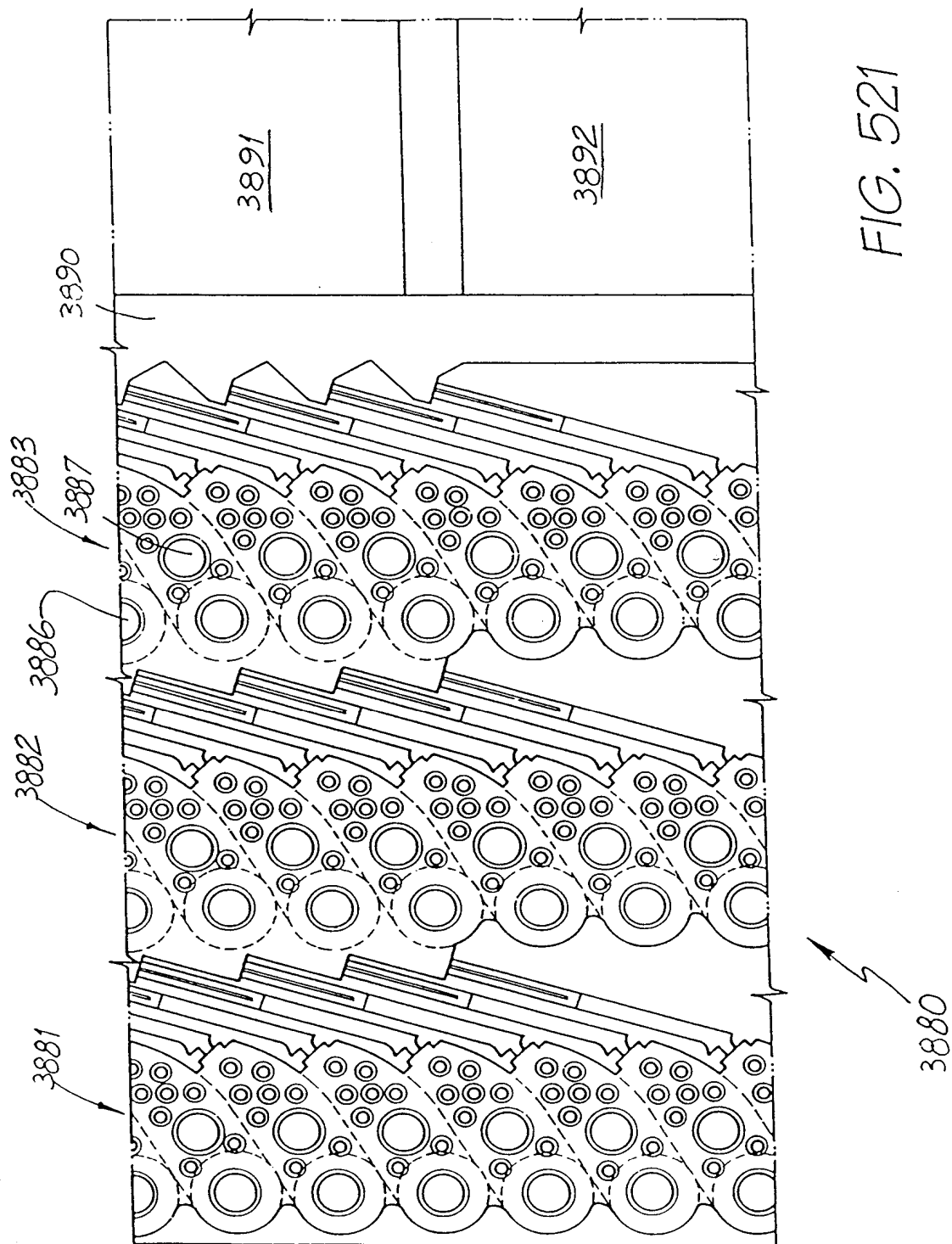
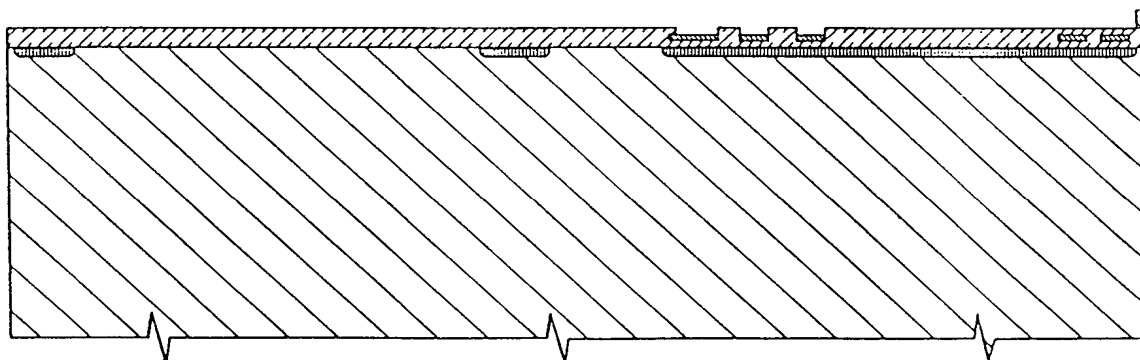
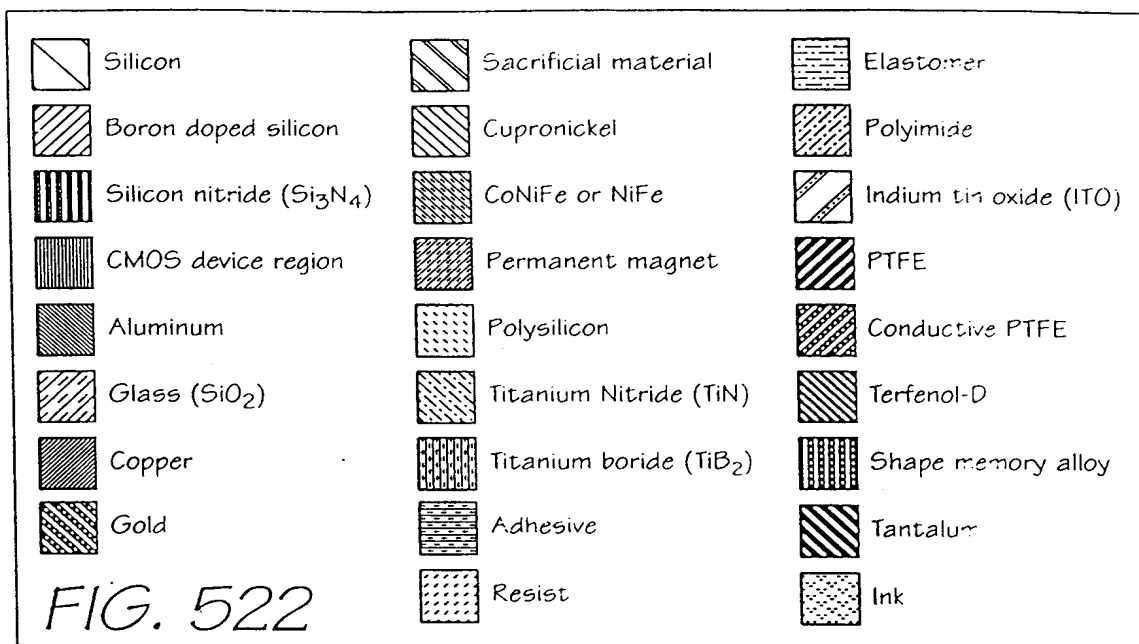
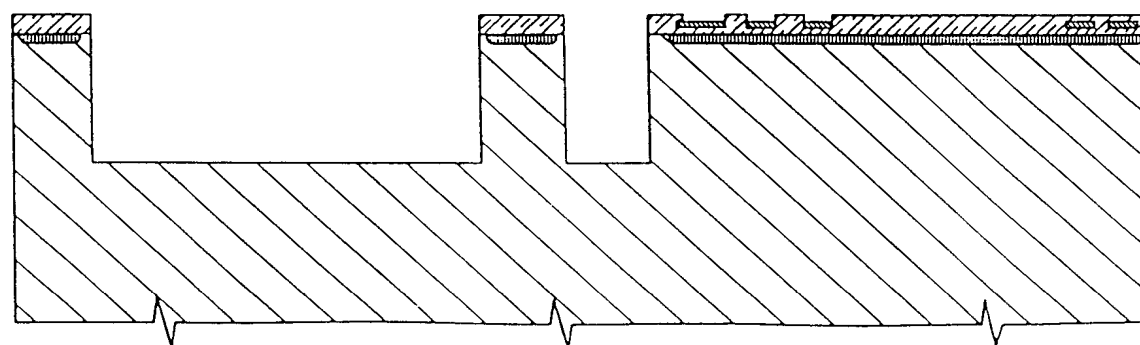


FIG. 520

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*FIG. 523**FIG. 524*

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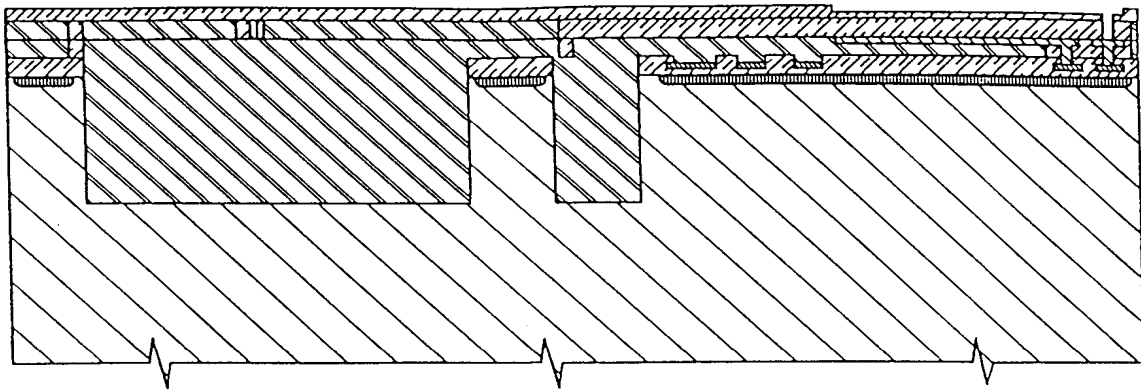


FIG. 531

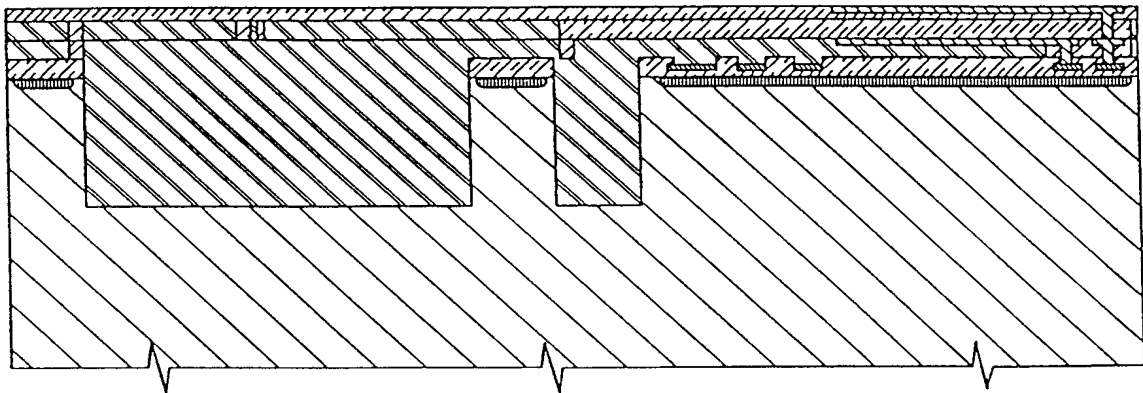


FIG. 532

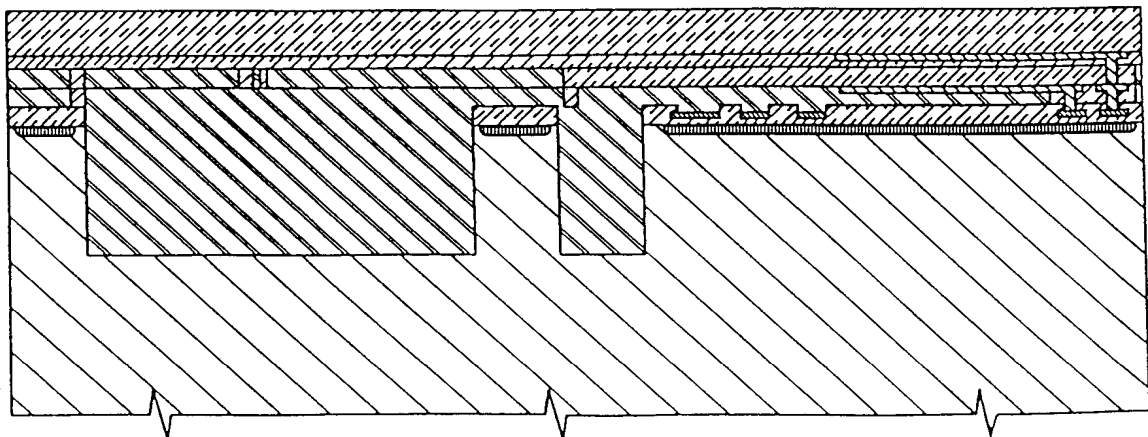


FIG. 533

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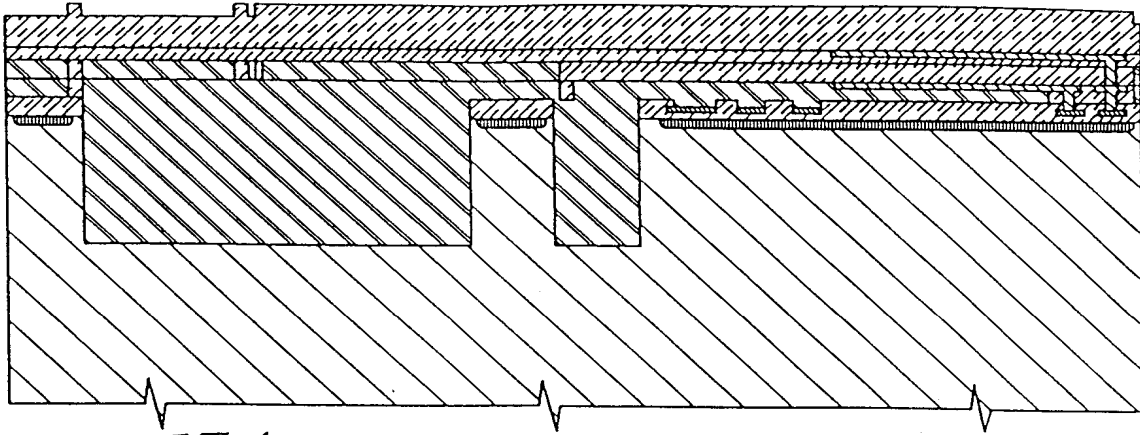


FIG. 534

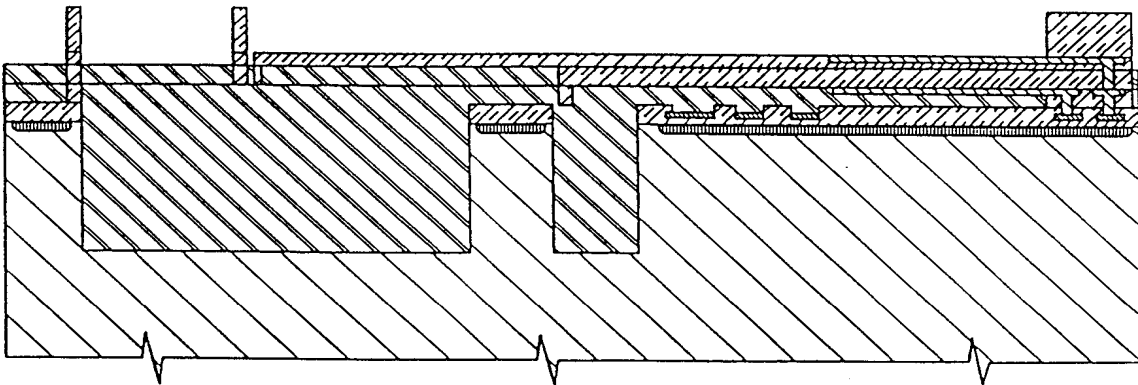


FIG. 535

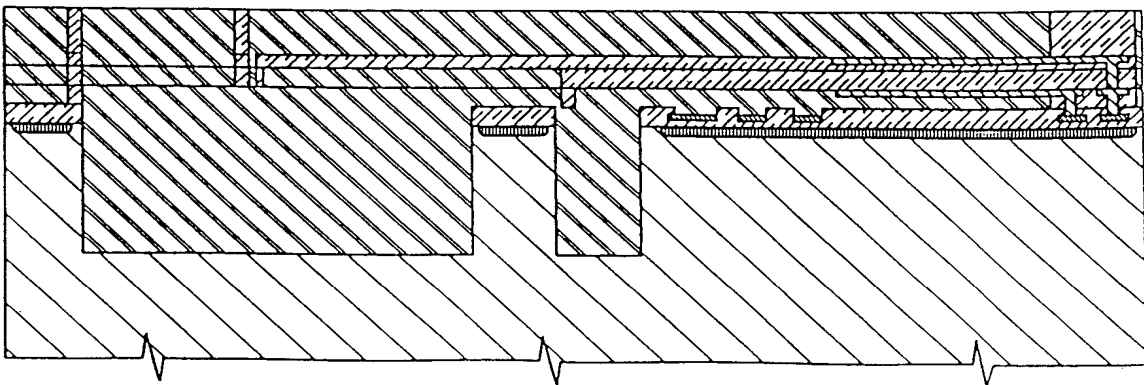


FIG. 536

SUBSTITUTE SHEET (Rule 26)

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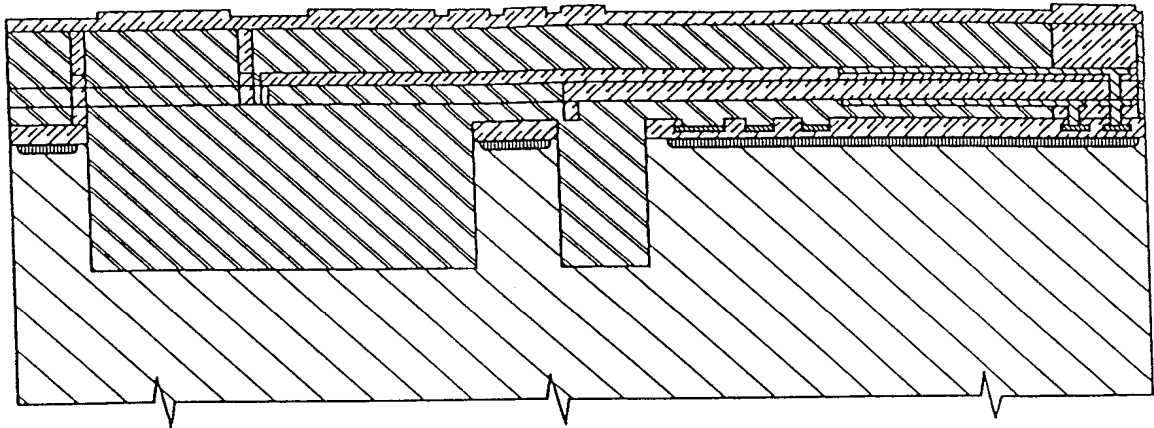


FIG. 537

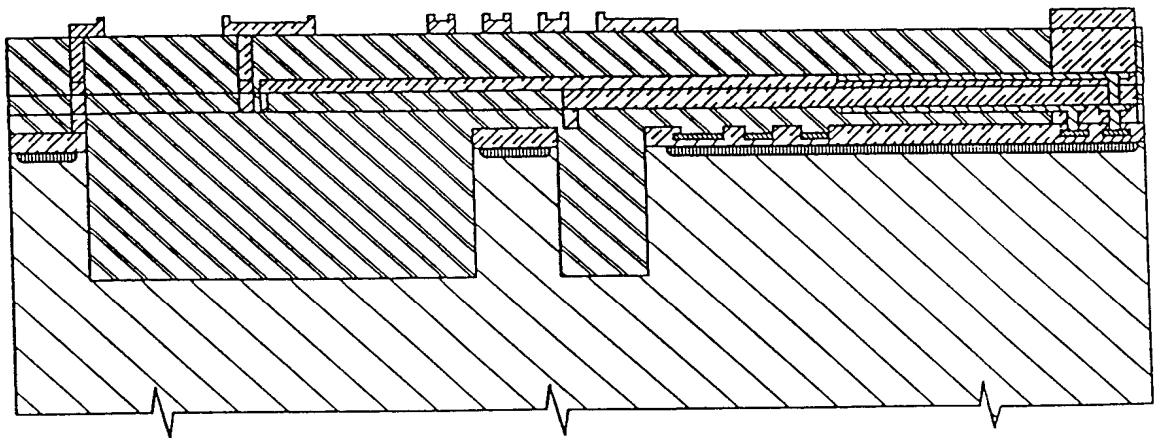


FIG. 538

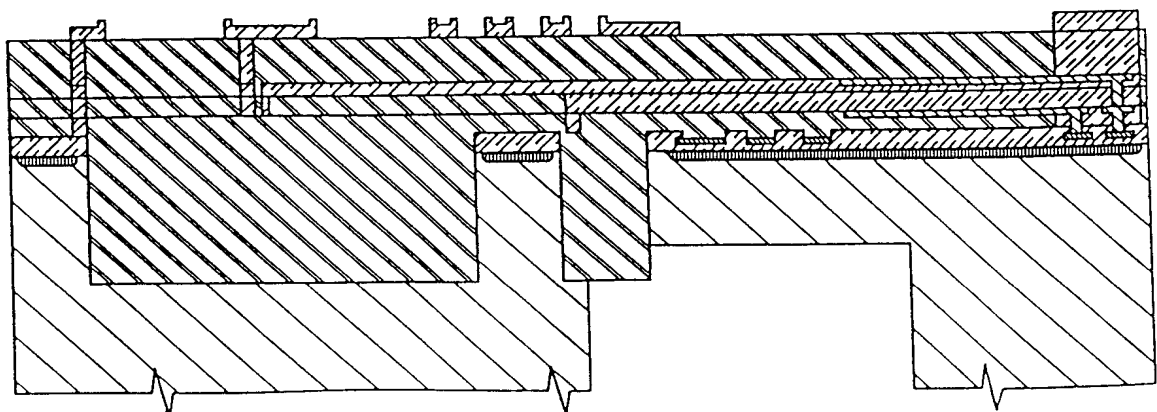


FIG. 539 SUBSTITUTE SHEET (Rule 26) (RO/AU)

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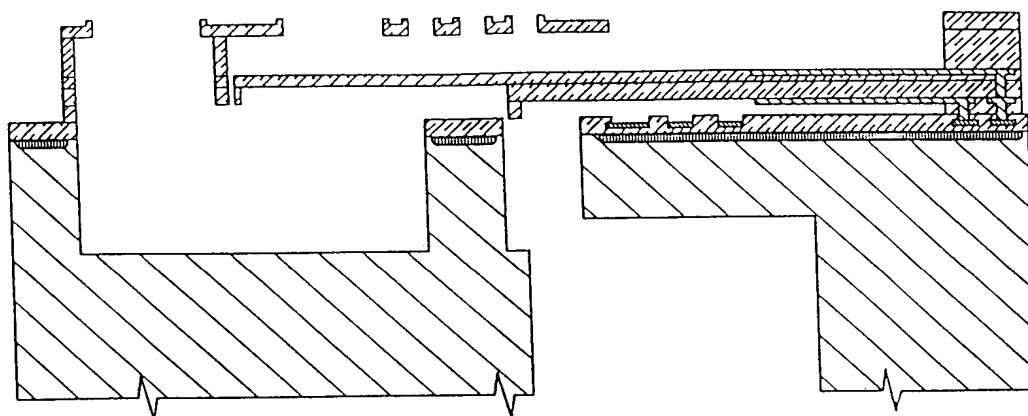


FIG. 540

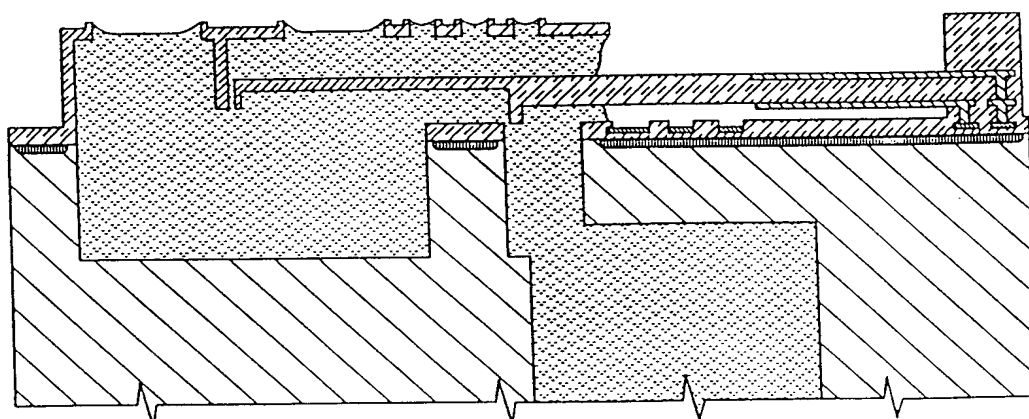


FIG. 541

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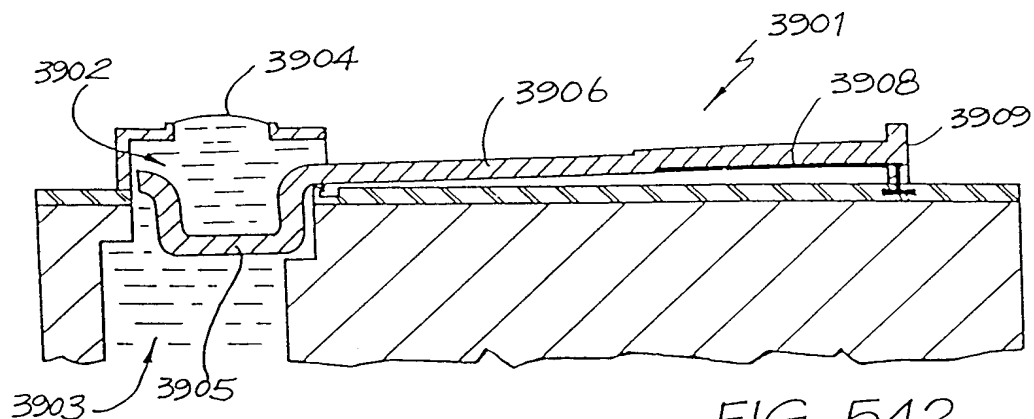


FIG. 542

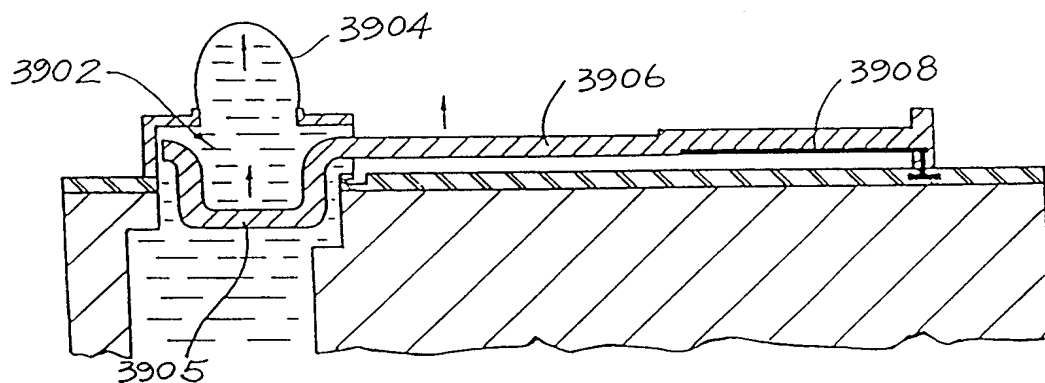


FIG. 543

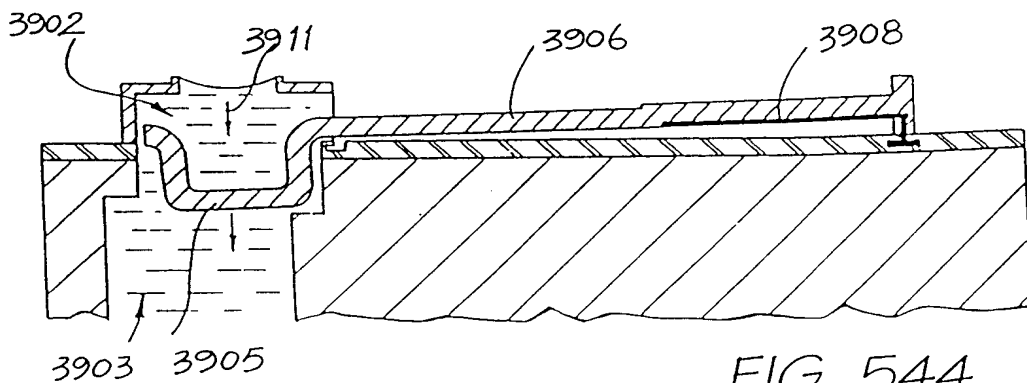
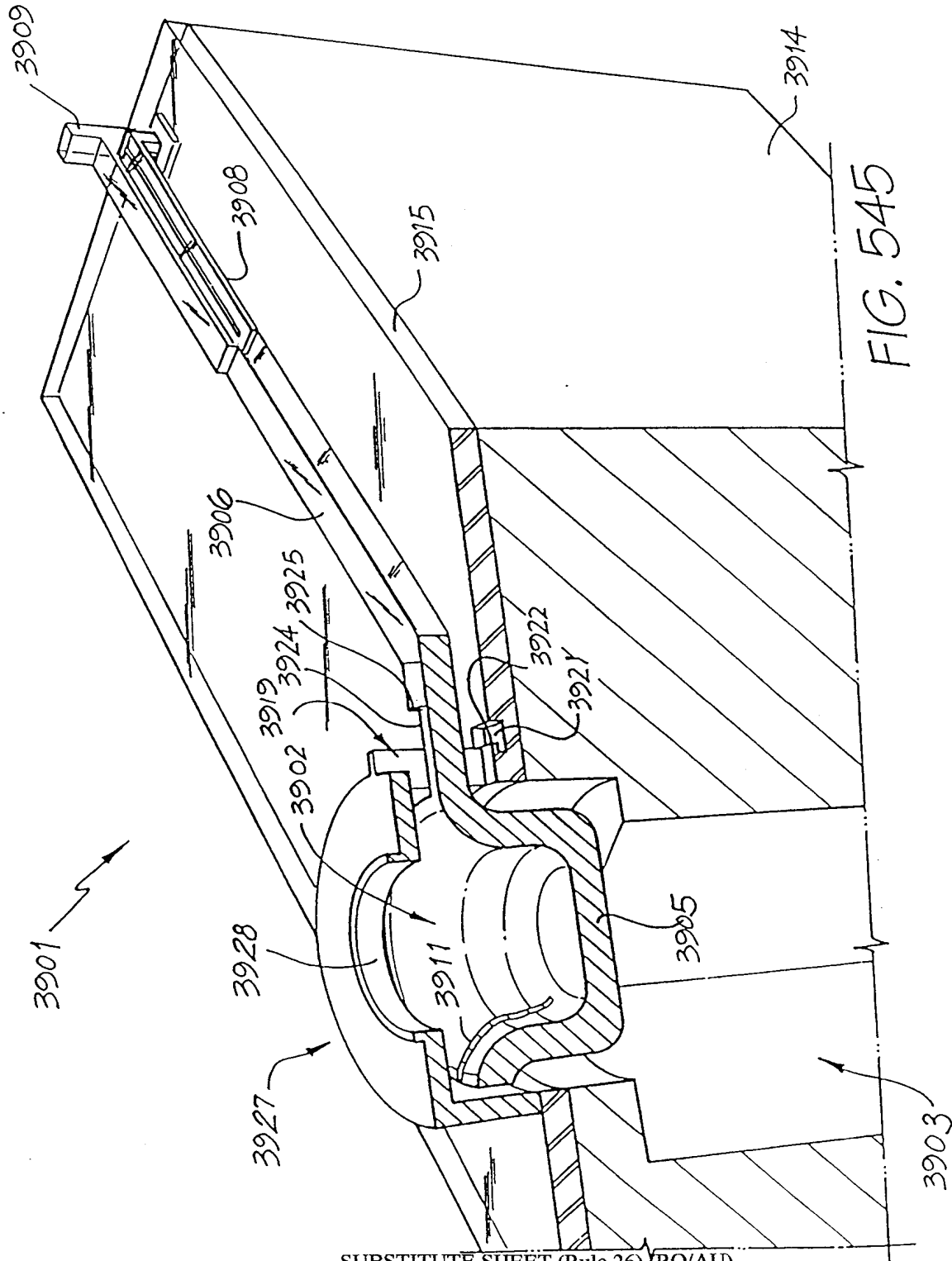
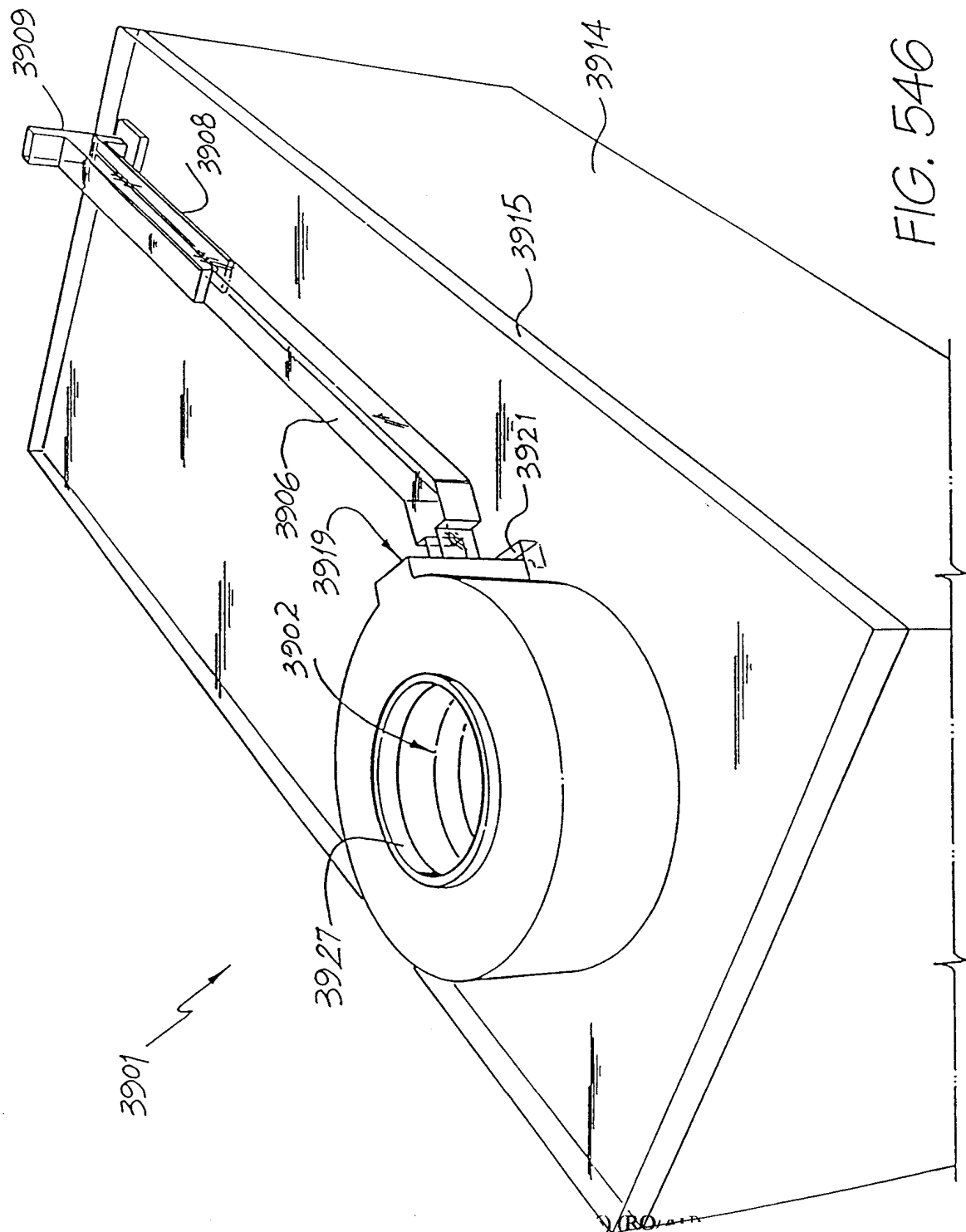


FIG. 544

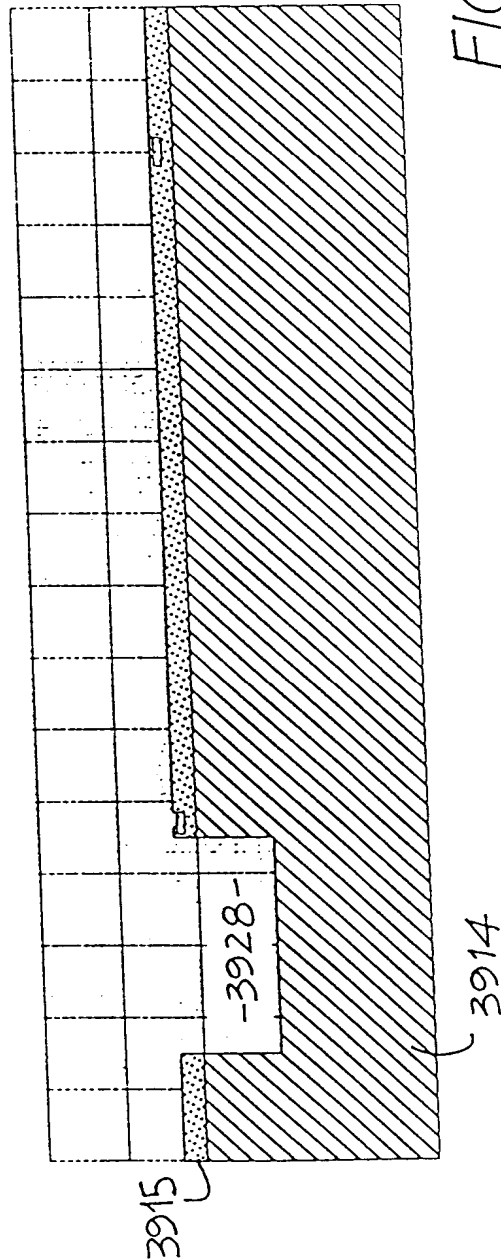
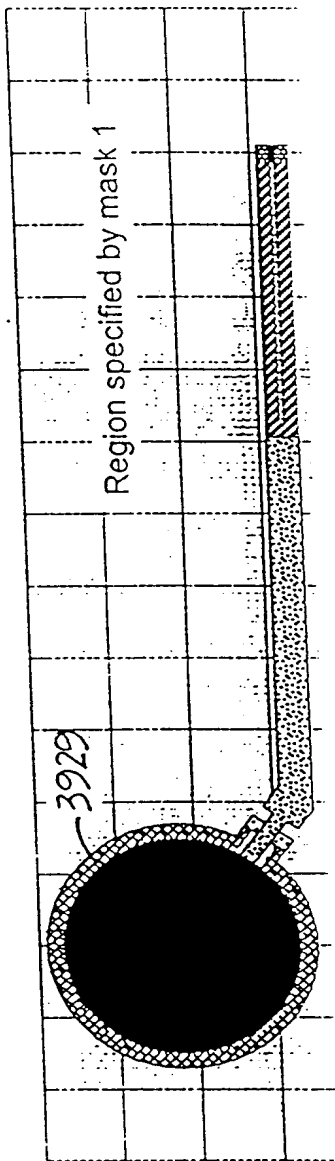
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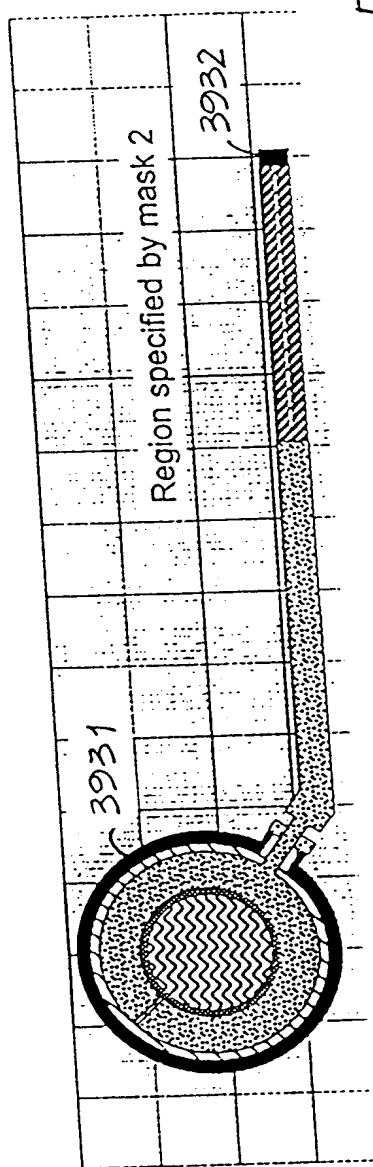


FIG. 548a

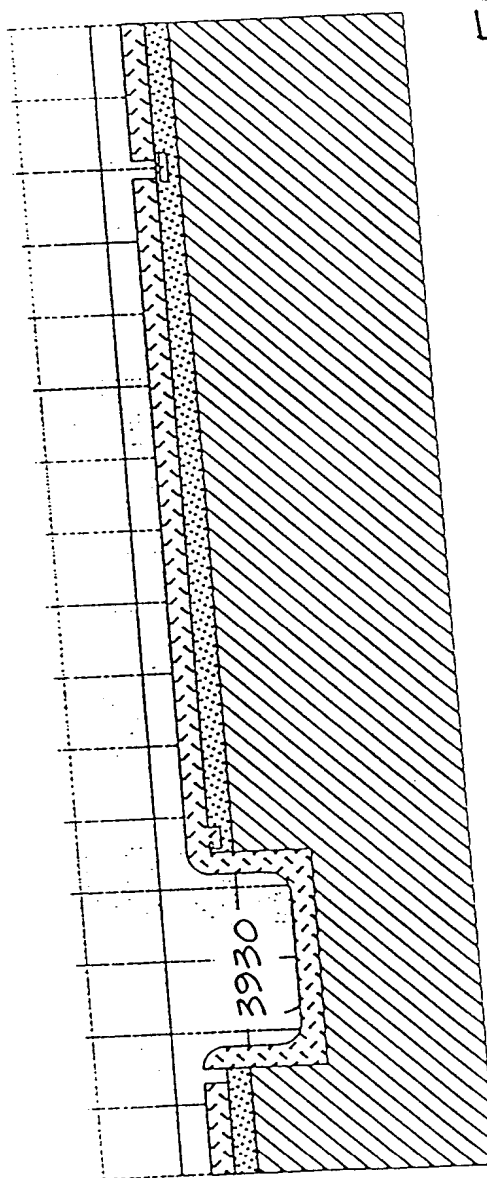


FIG. 548b

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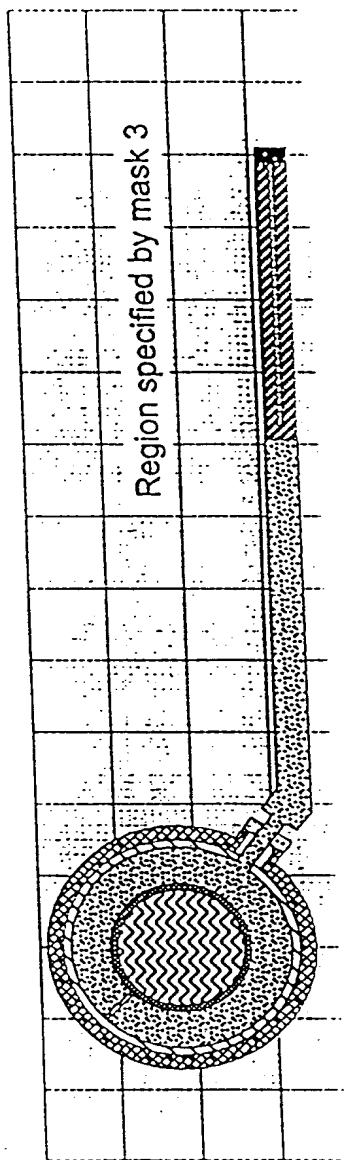


FIG. 549a

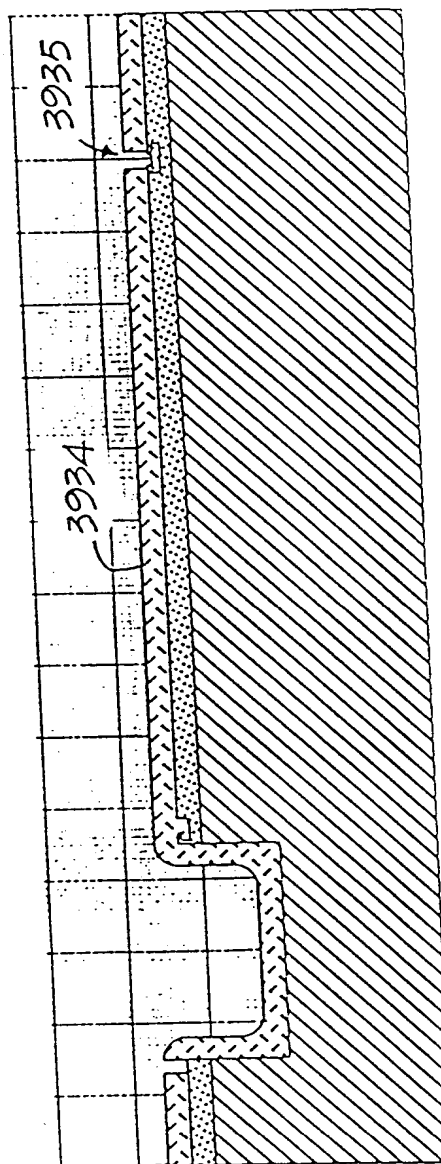


FIG. 549b

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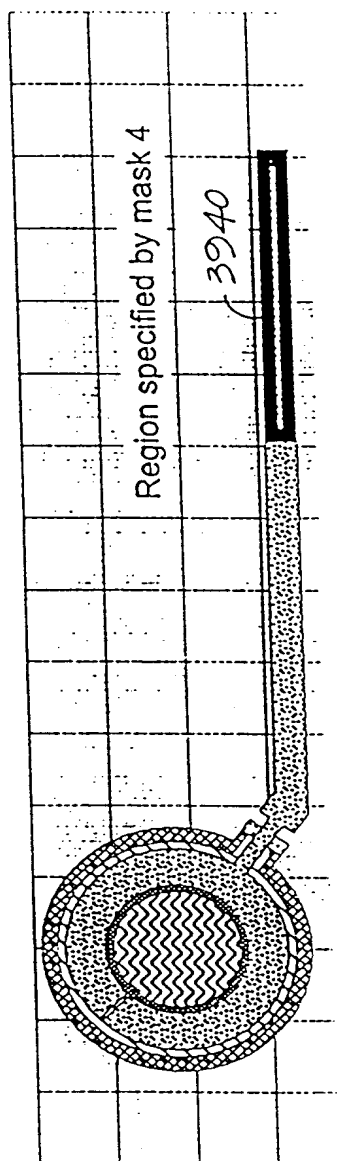


FIG. 550a

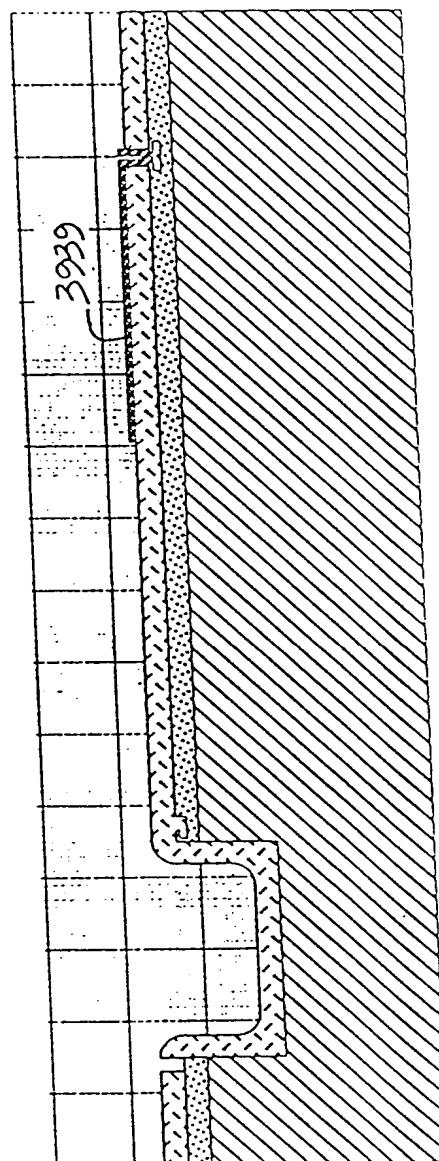


FIG. 550b

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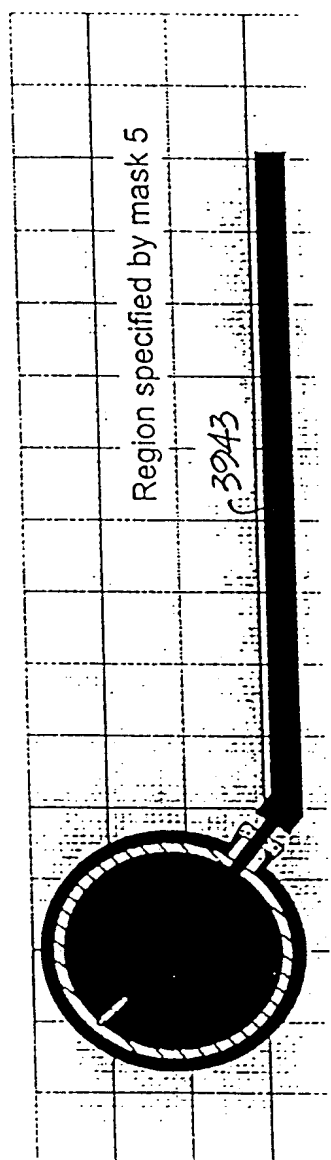


FIG. 551a

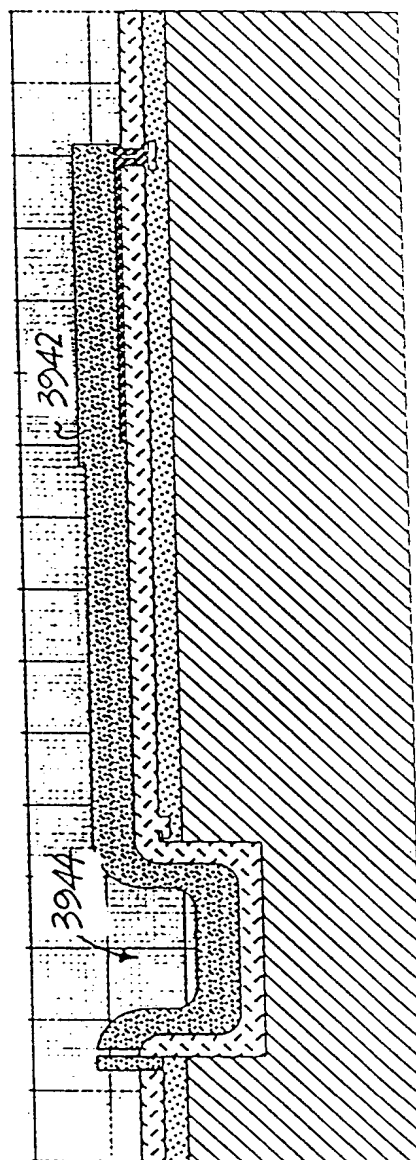


FIG. 551b

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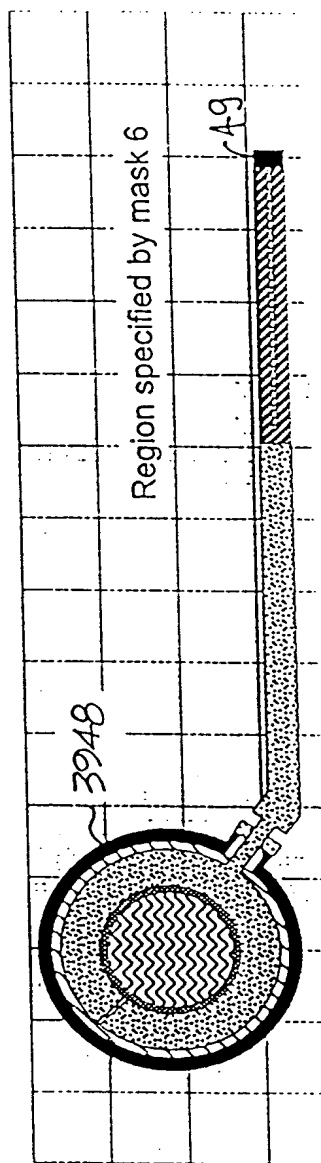


FIG. 552a

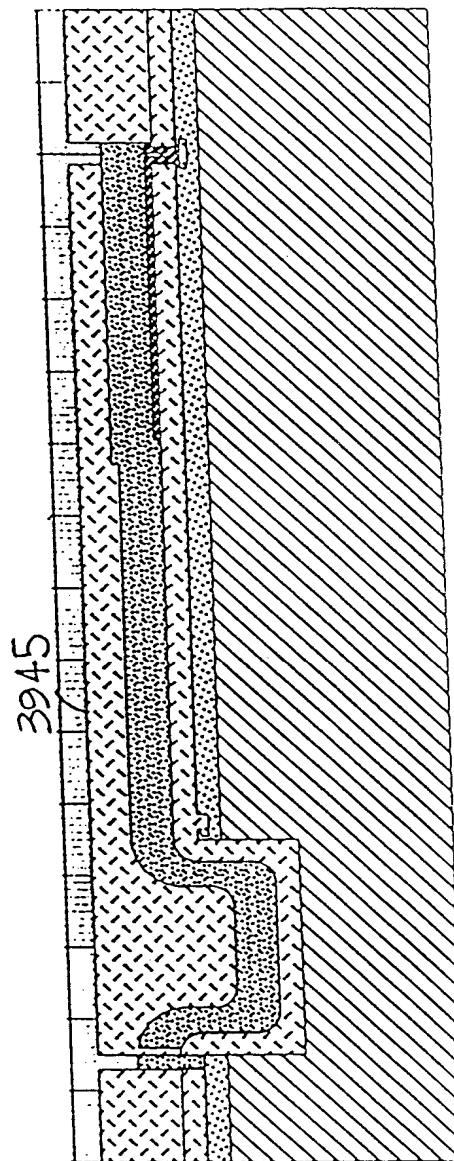


FIG. 552b

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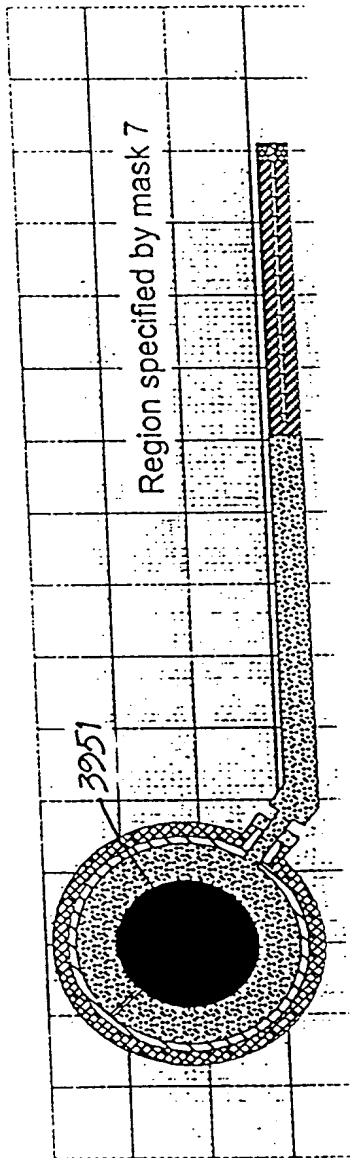


FIG. 553a

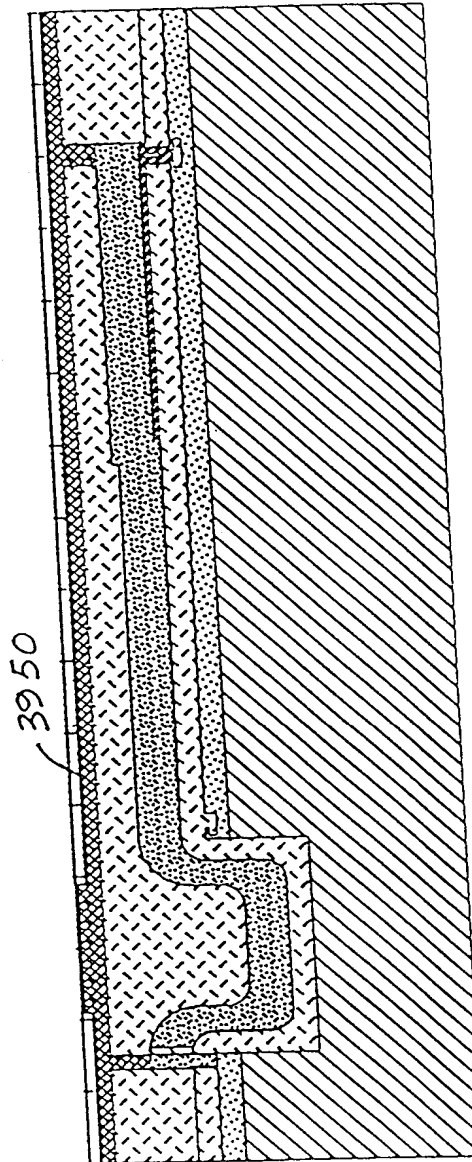


FIG. 553b

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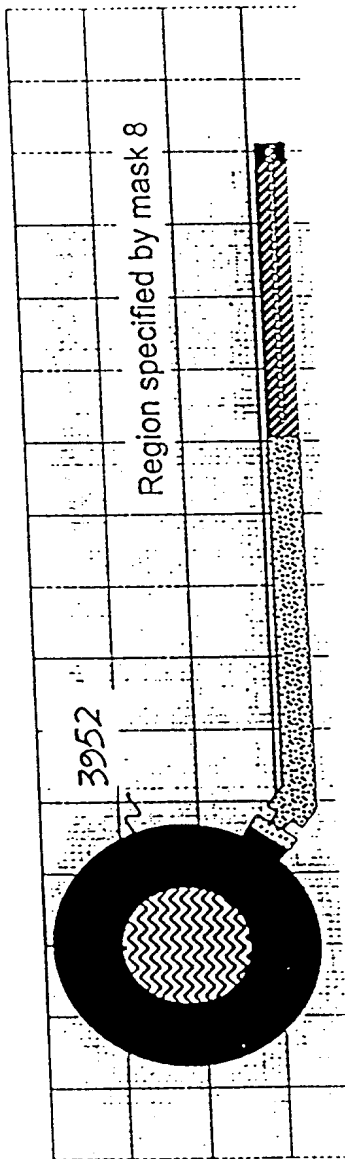


FIG. 554a

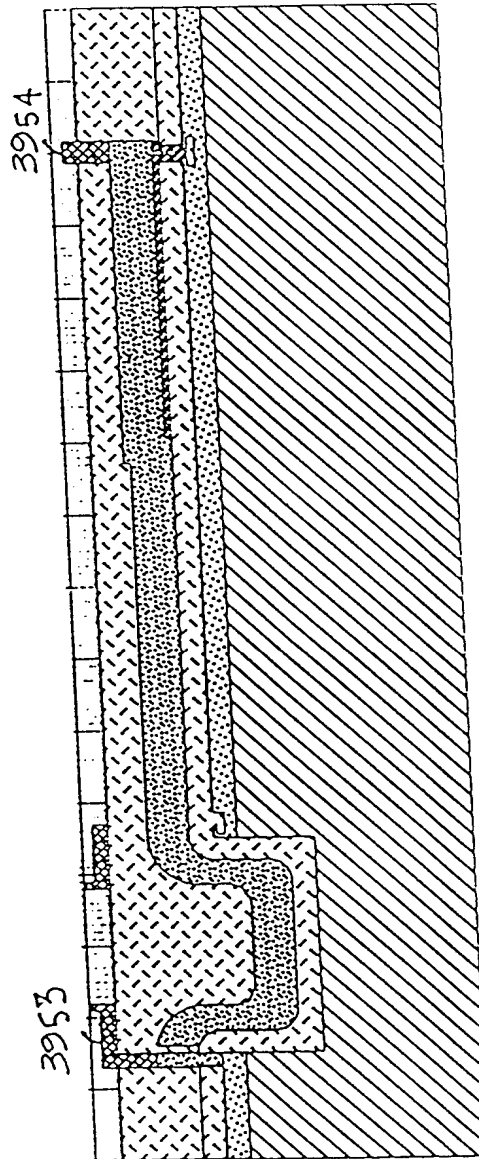


FIG. 554b

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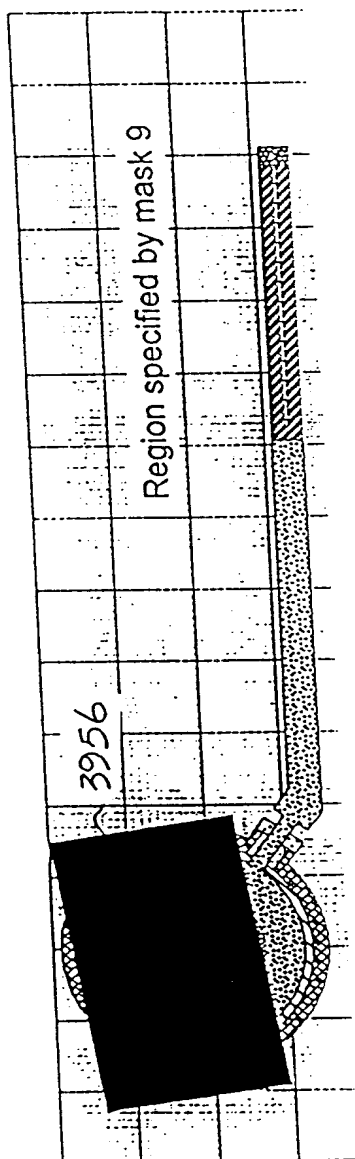


FIG. 555a

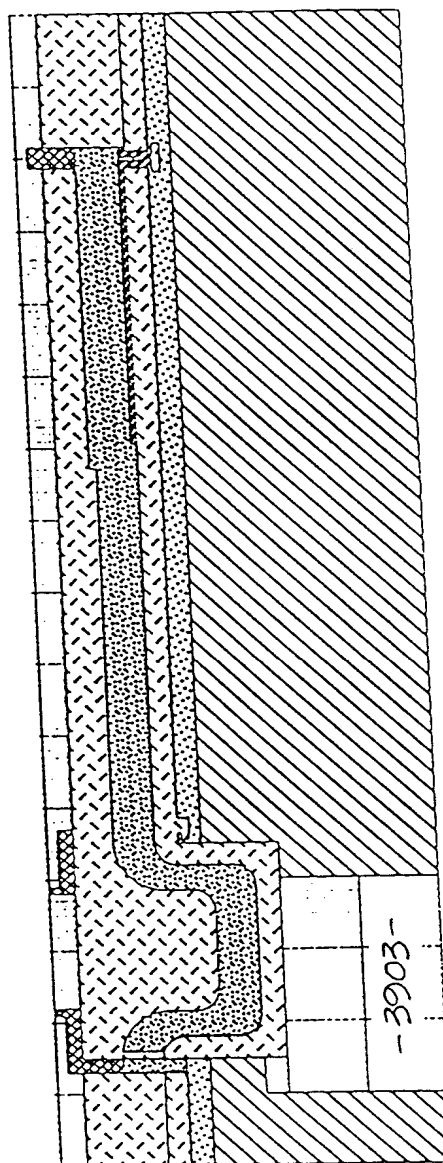


FIG. 555b

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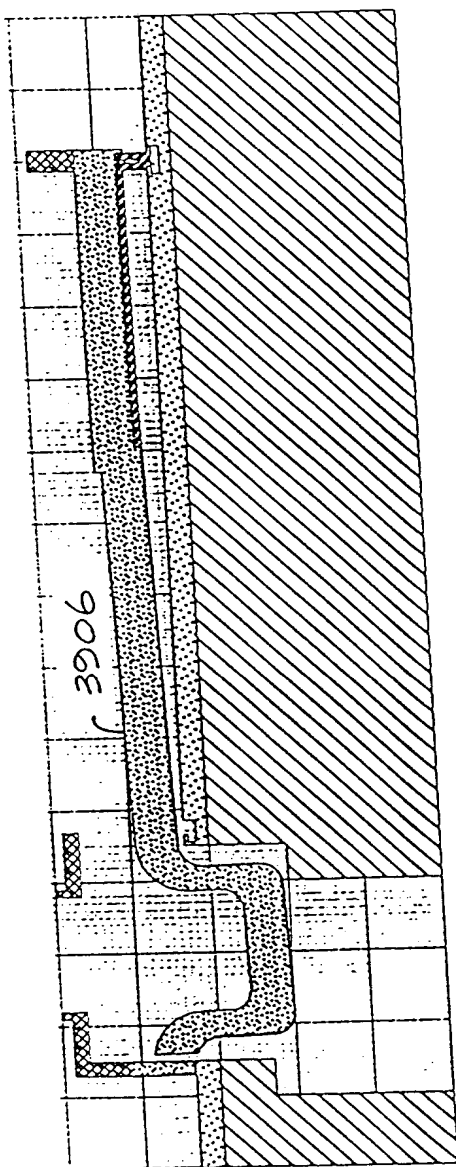
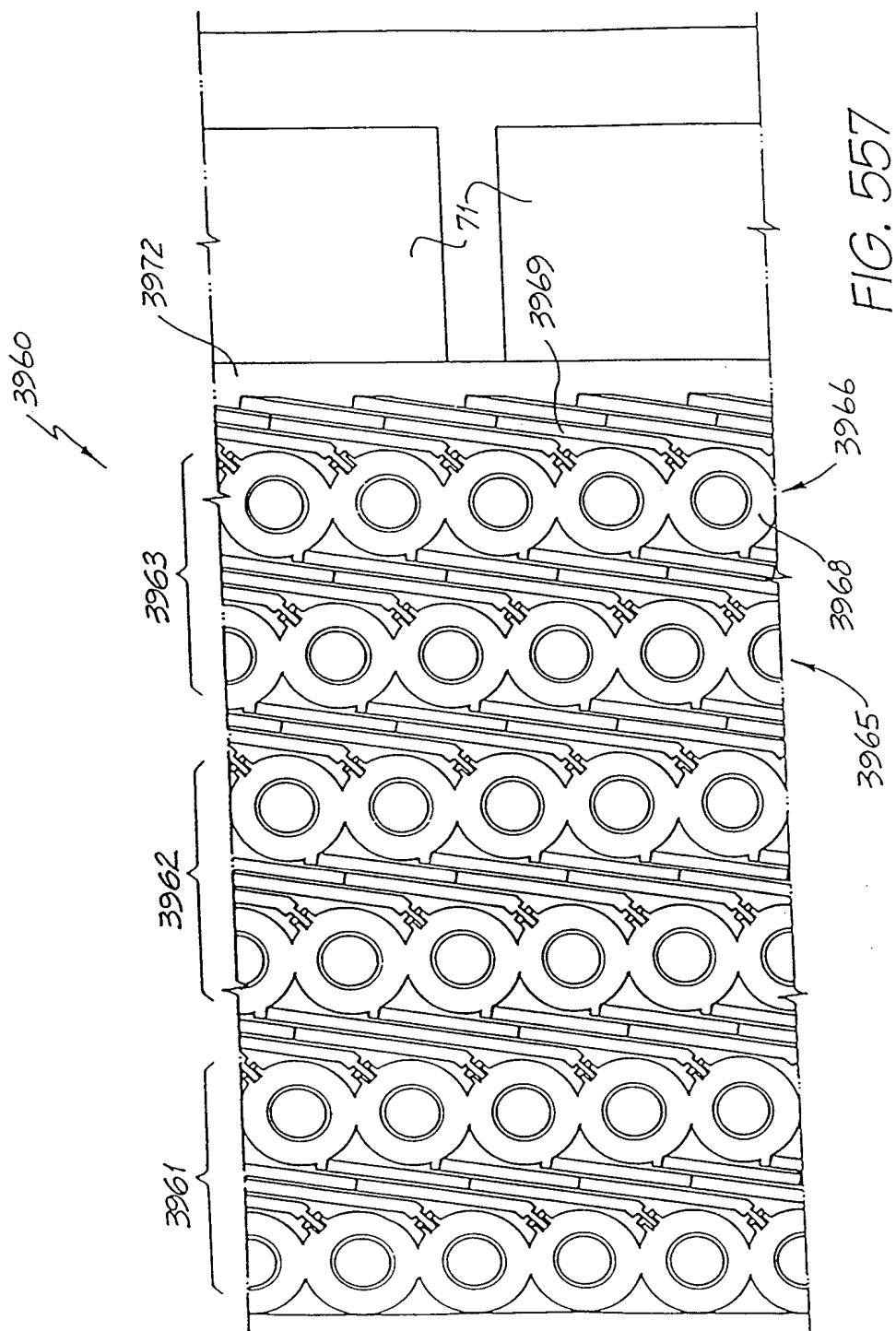


FIG. 556

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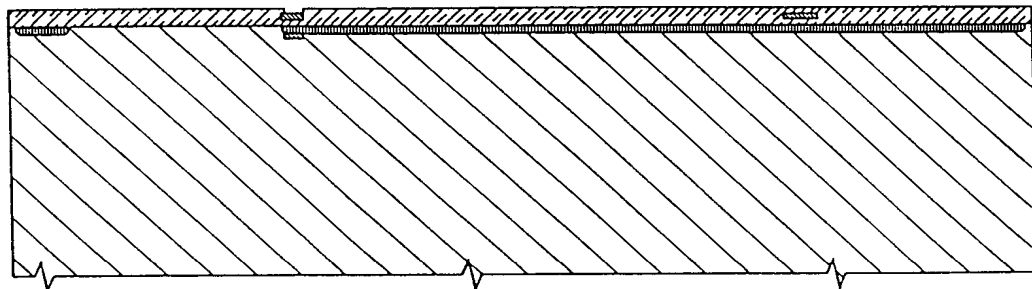
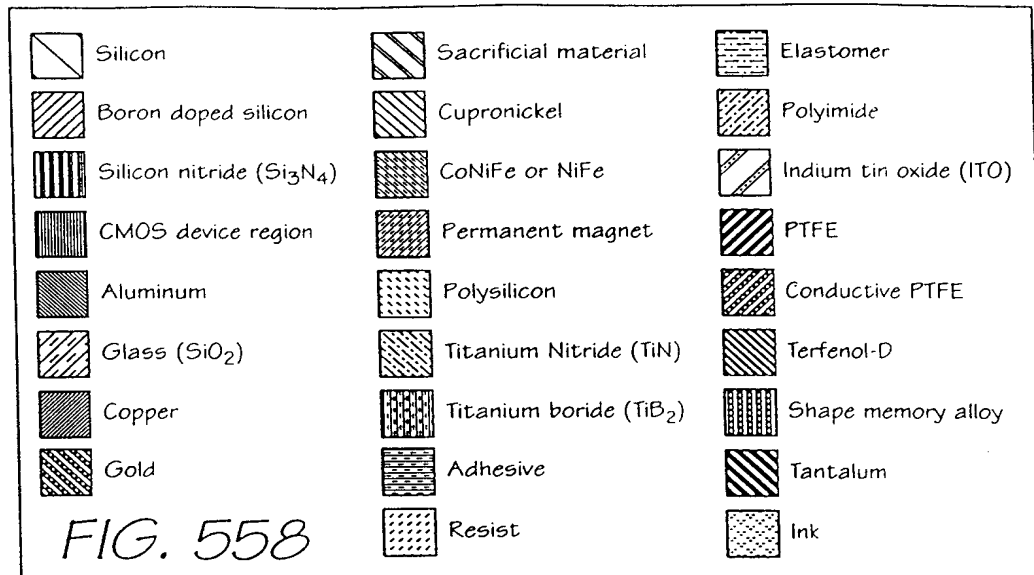


FIG. 559

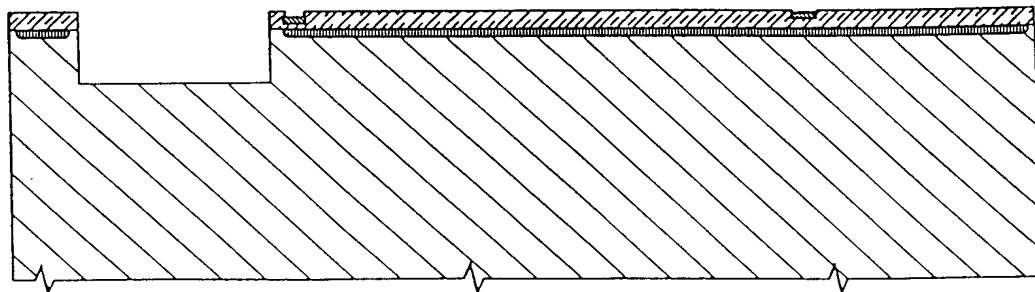


FIG. 560

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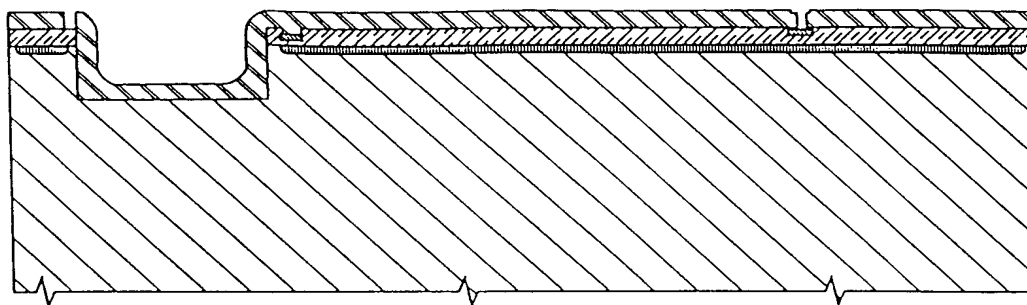


FIG. 561

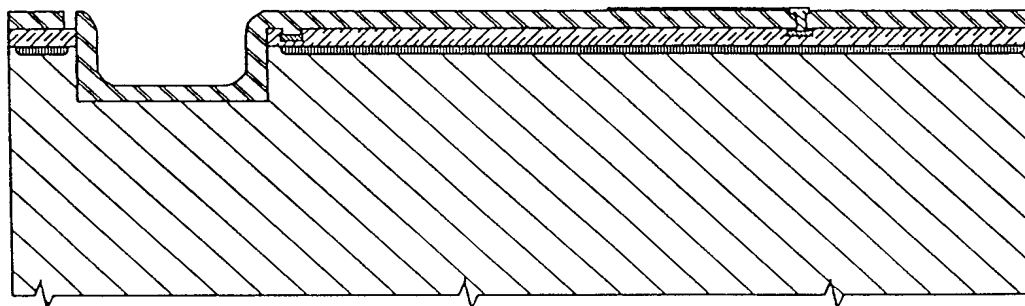


FIG. 562

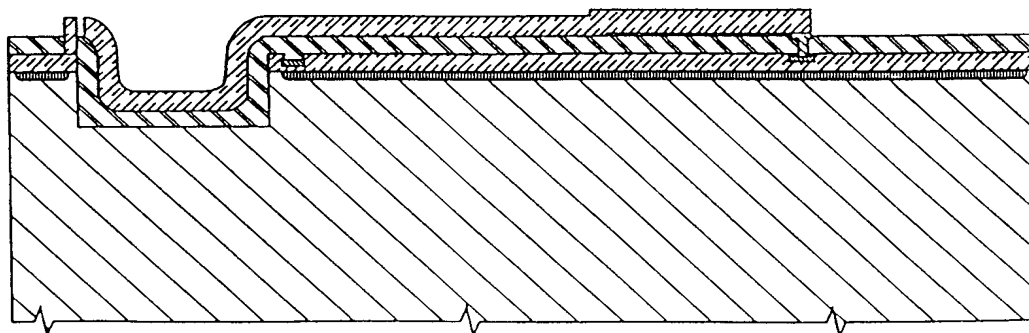


FIG. 563

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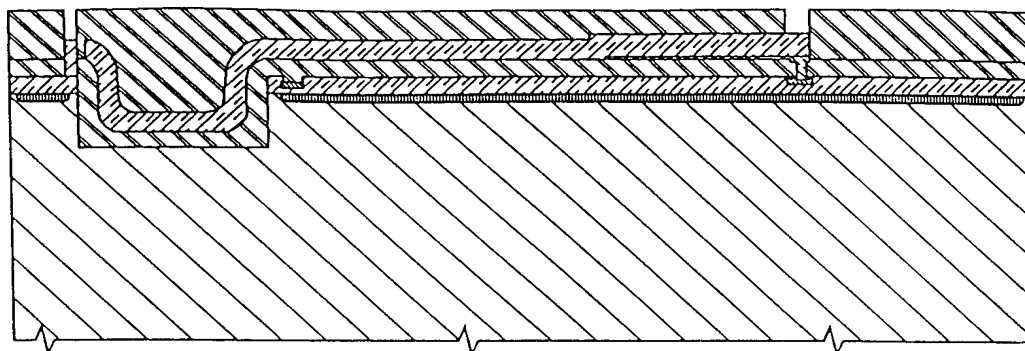


FIG. 564

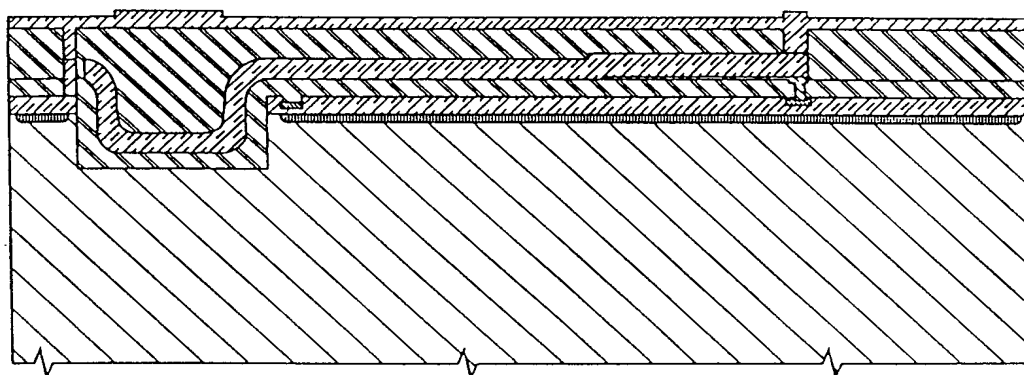


FIG. 565

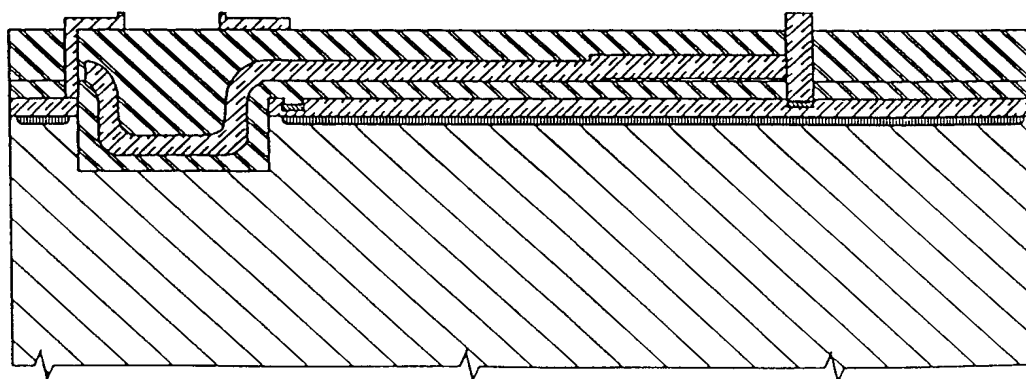


FIG. 566

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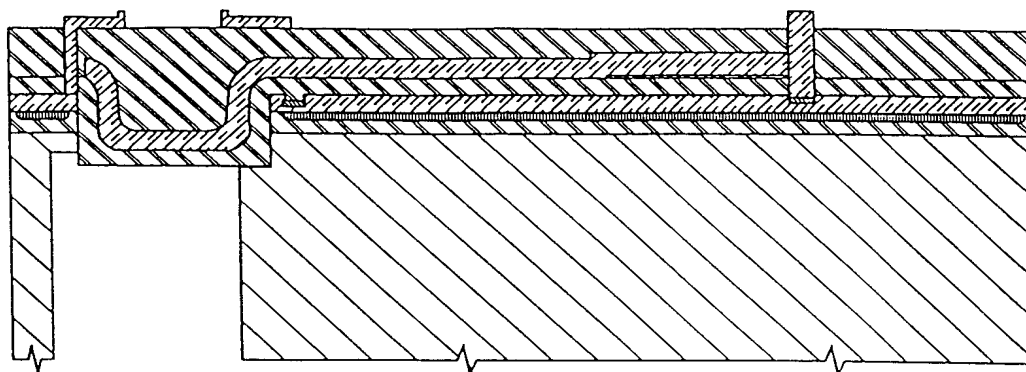


FIG. 567

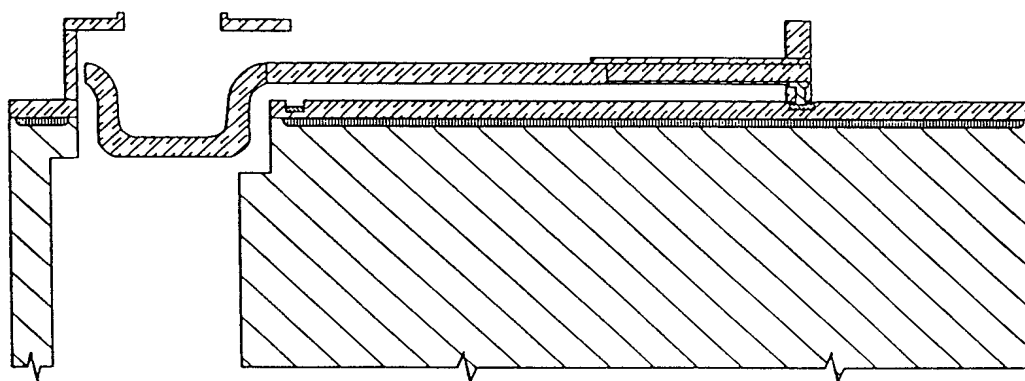


FIG. 568

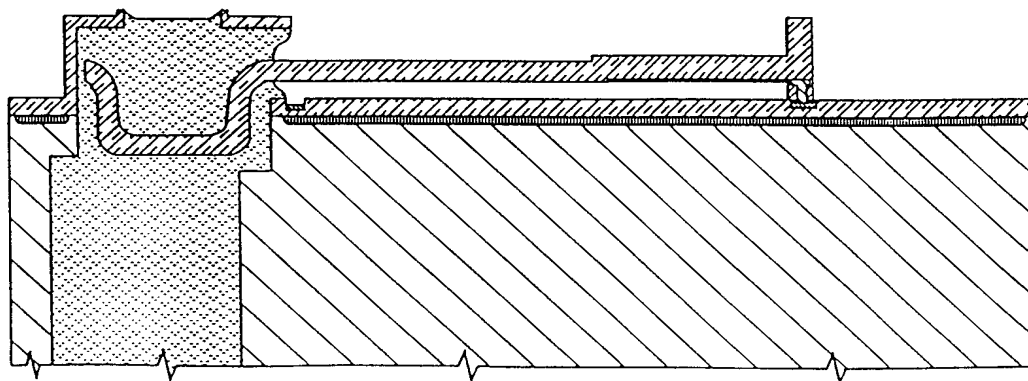
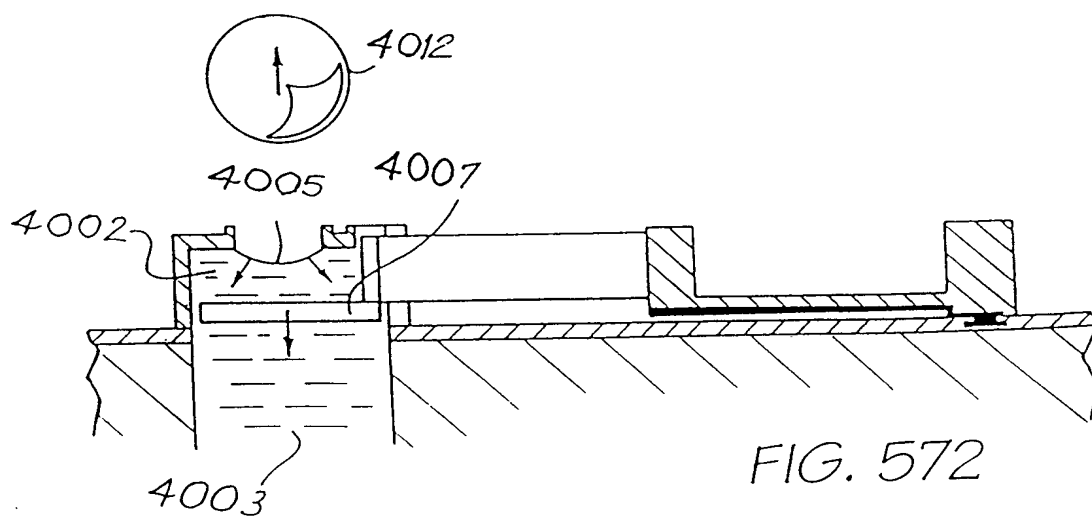
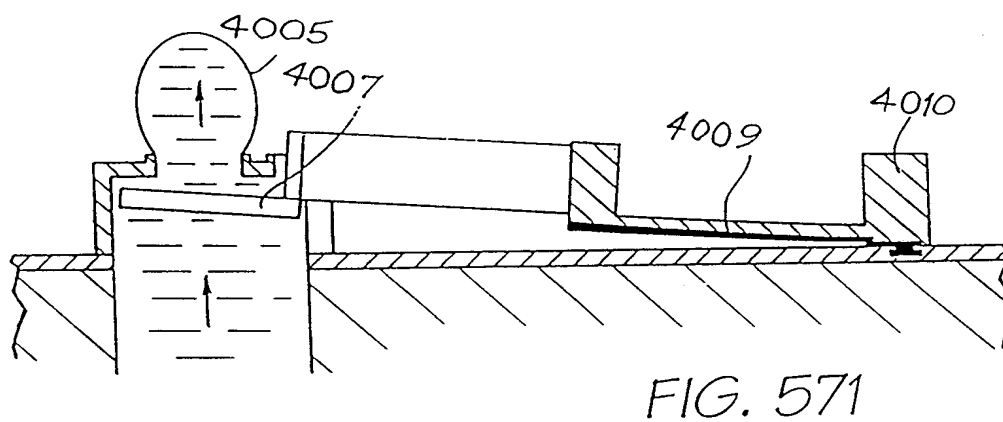
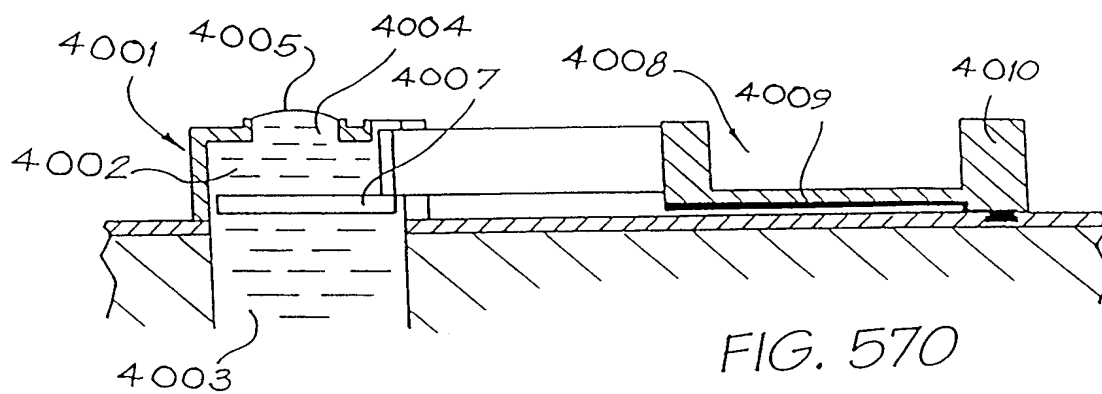
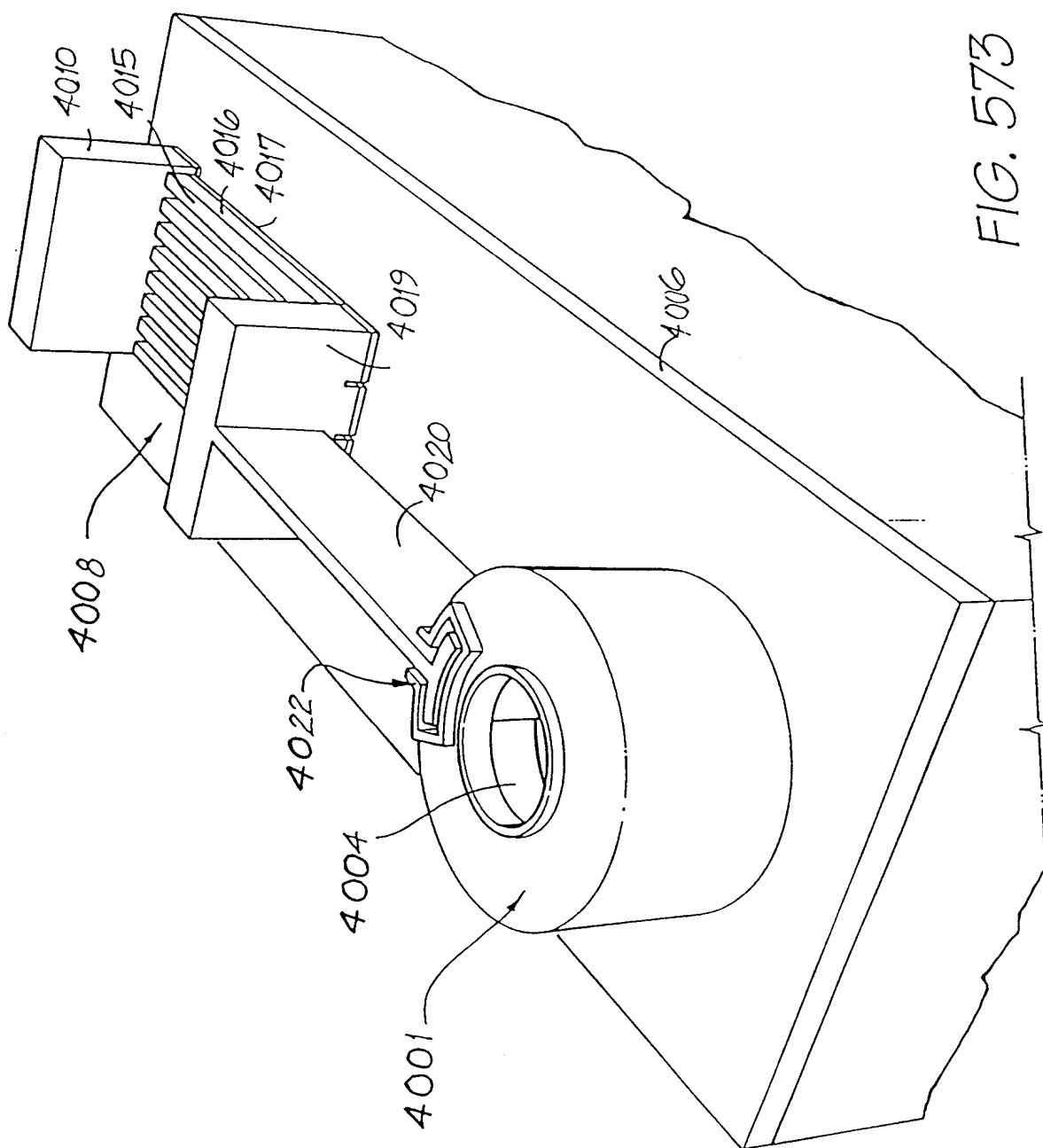


FIG. 569

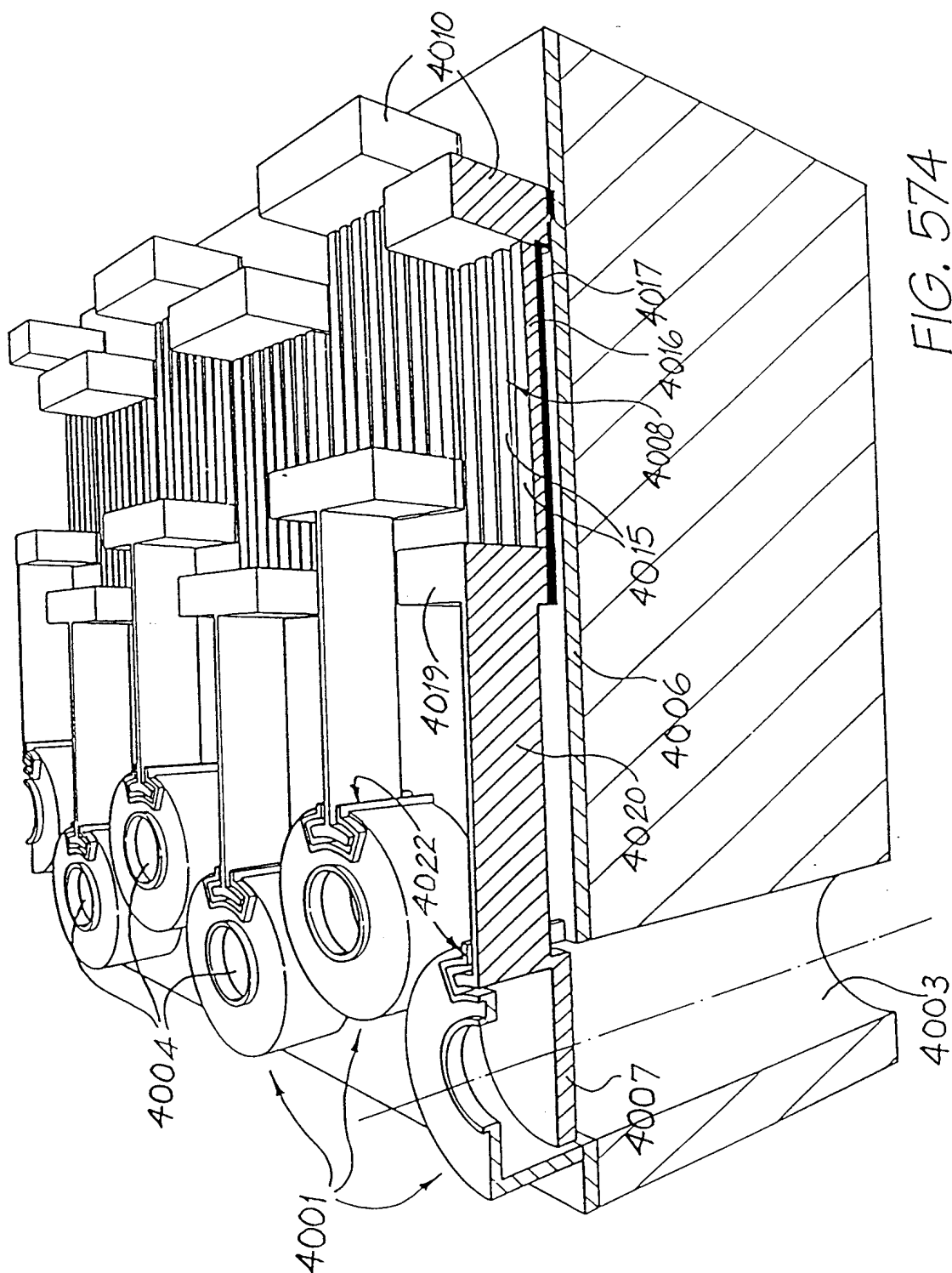
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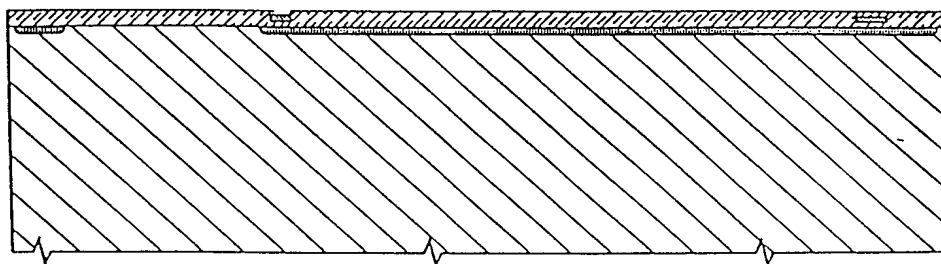
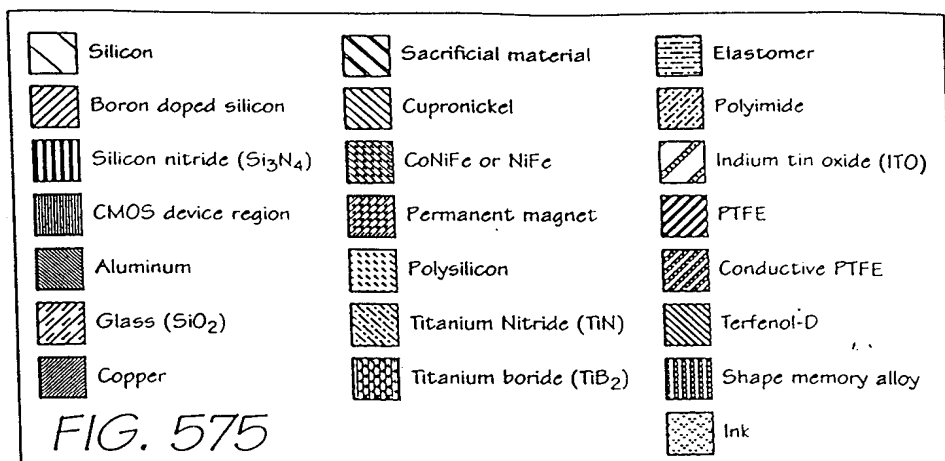
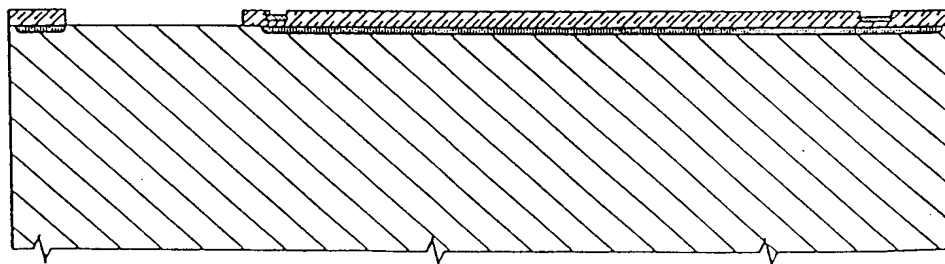
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*FIG. 576**FIG. 577*

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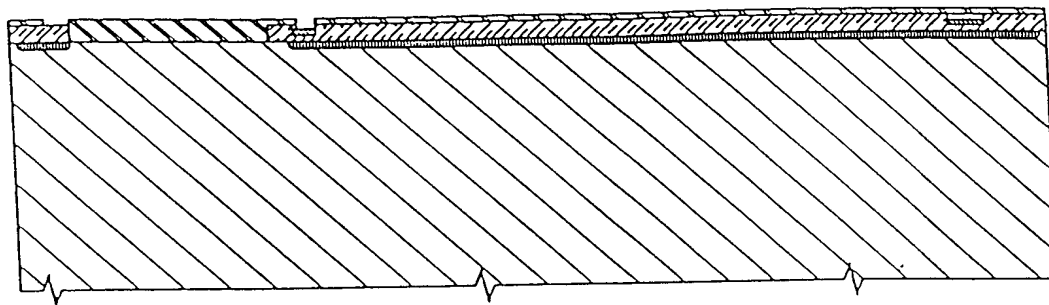


FIG. 578

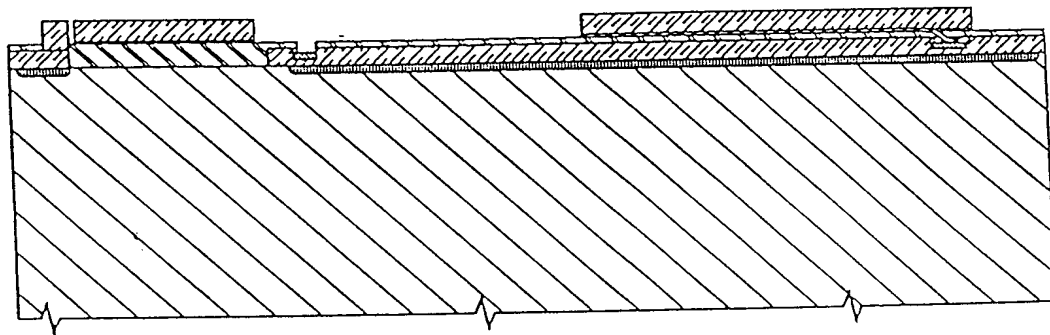


FIG. 579

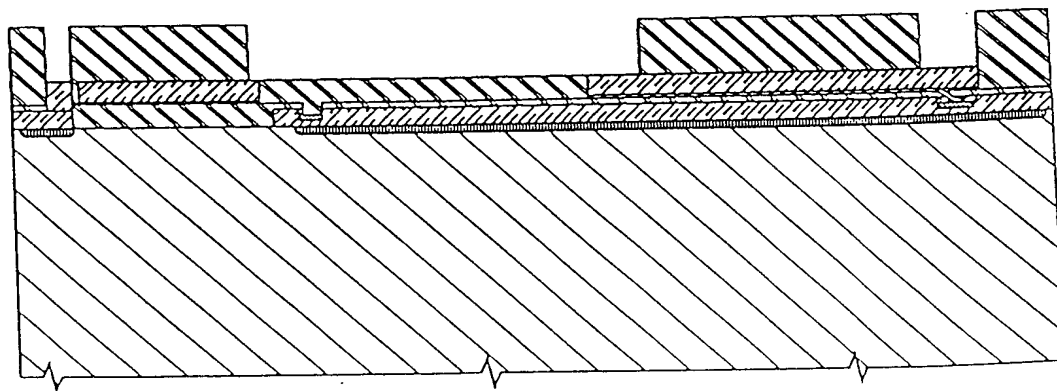


FIG. 580

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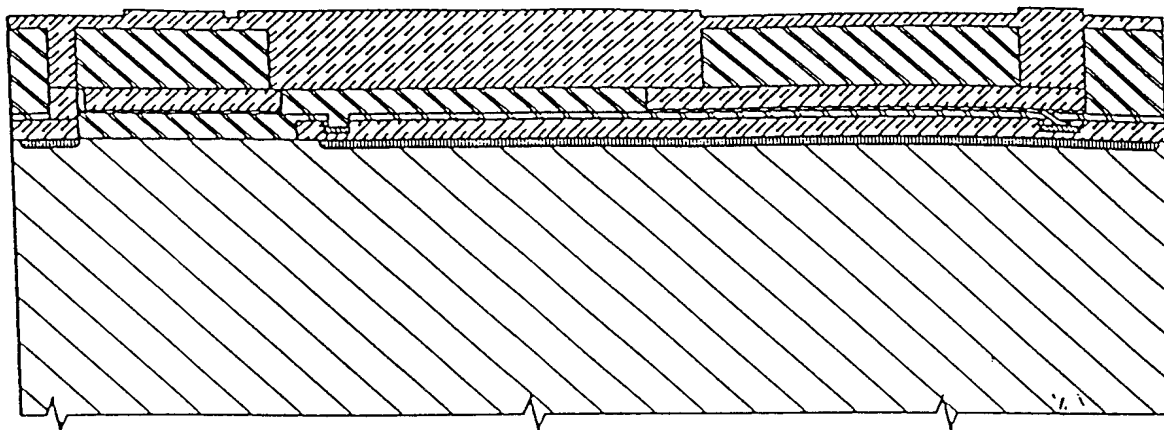


FIG. 581

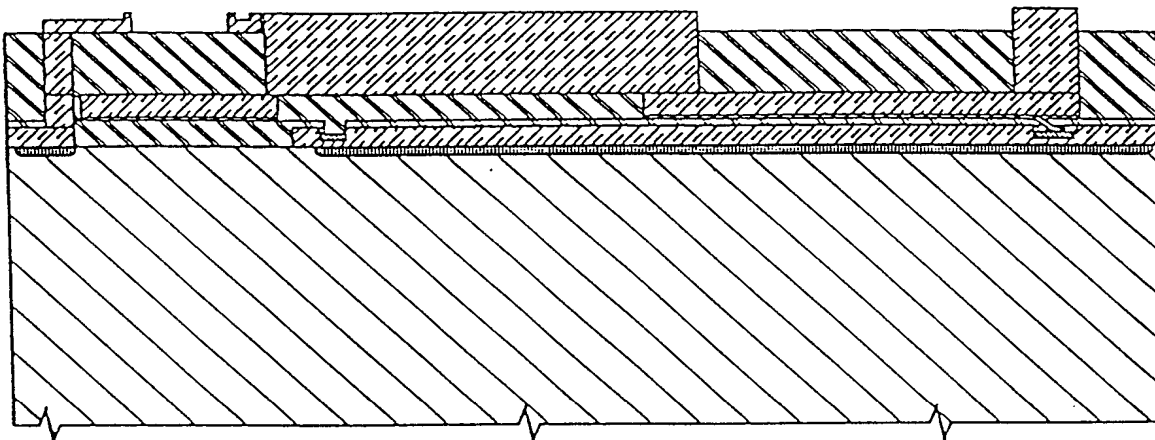


FIG. 582

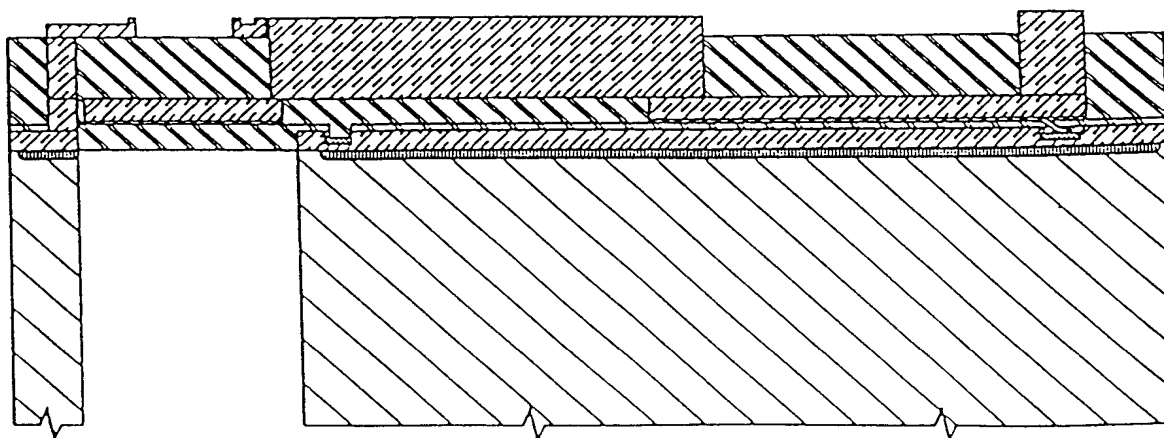


FIG. 583

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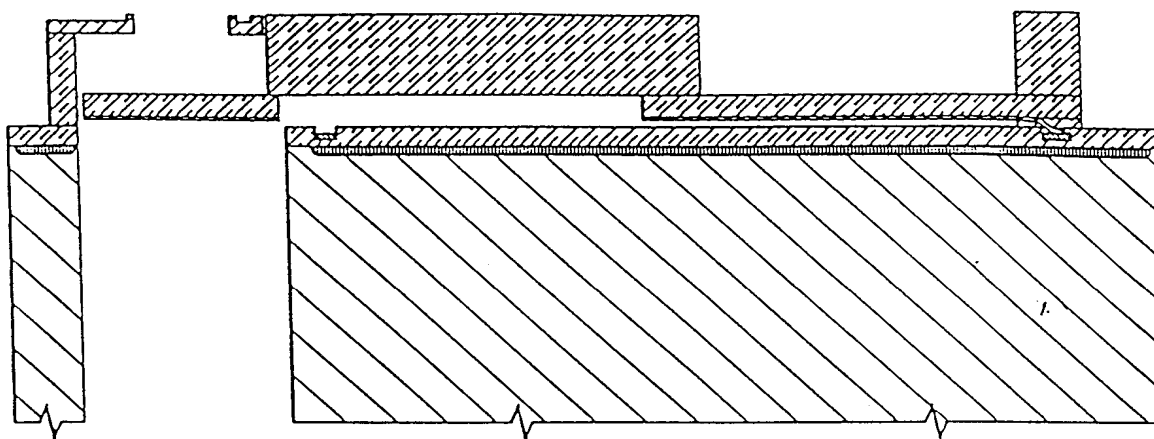


FIG. 584

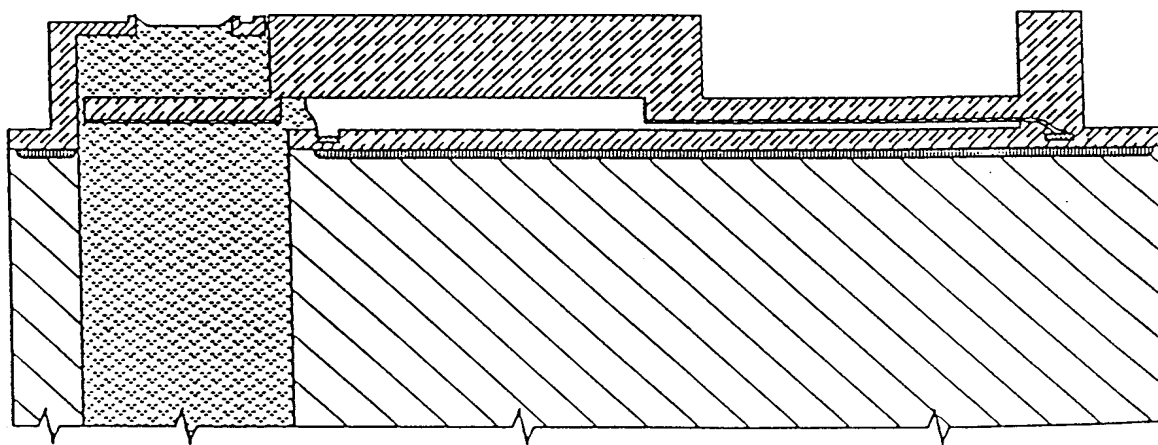


FIG. 585

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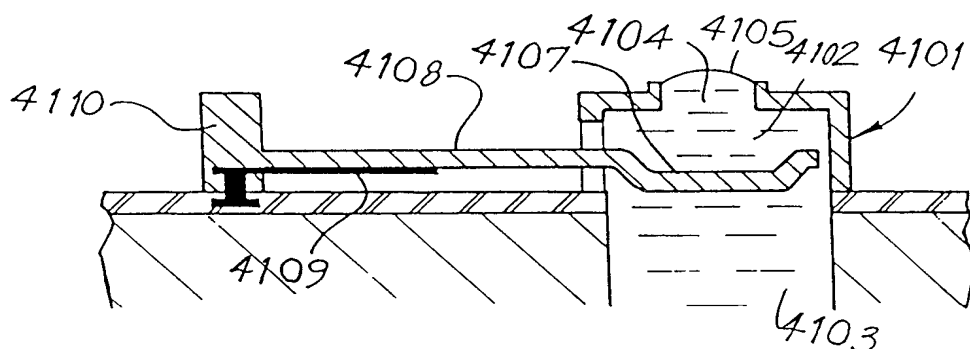


FIG. 586

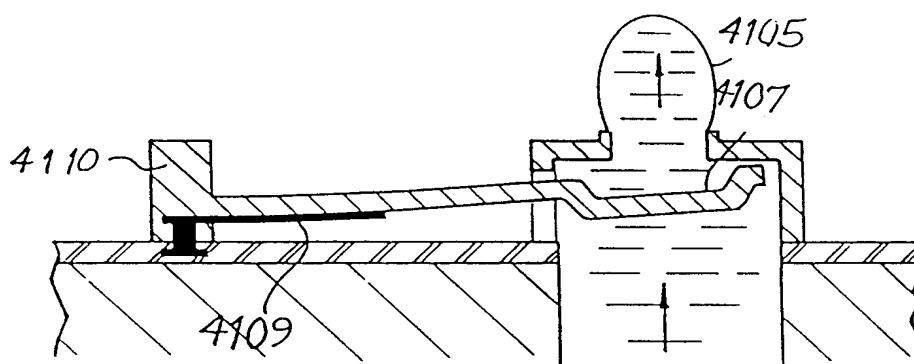


FIG. 587

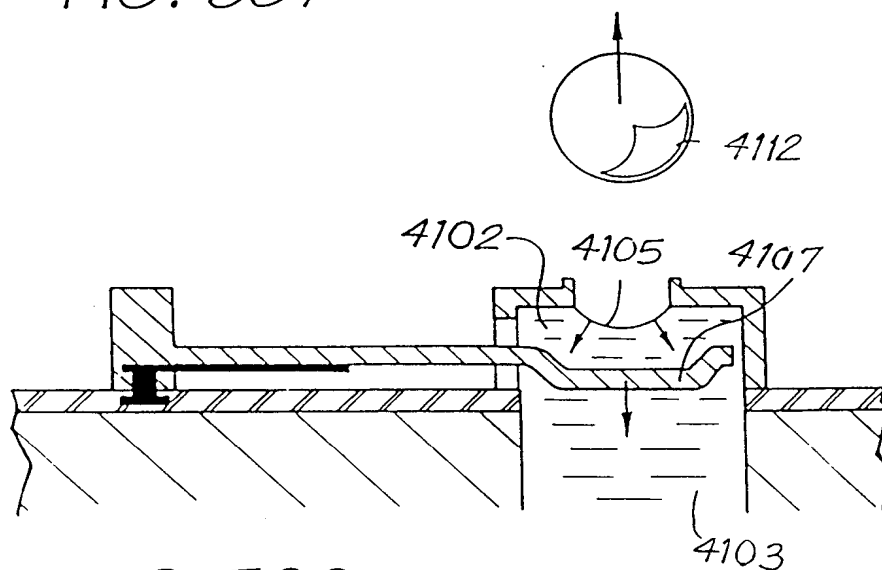
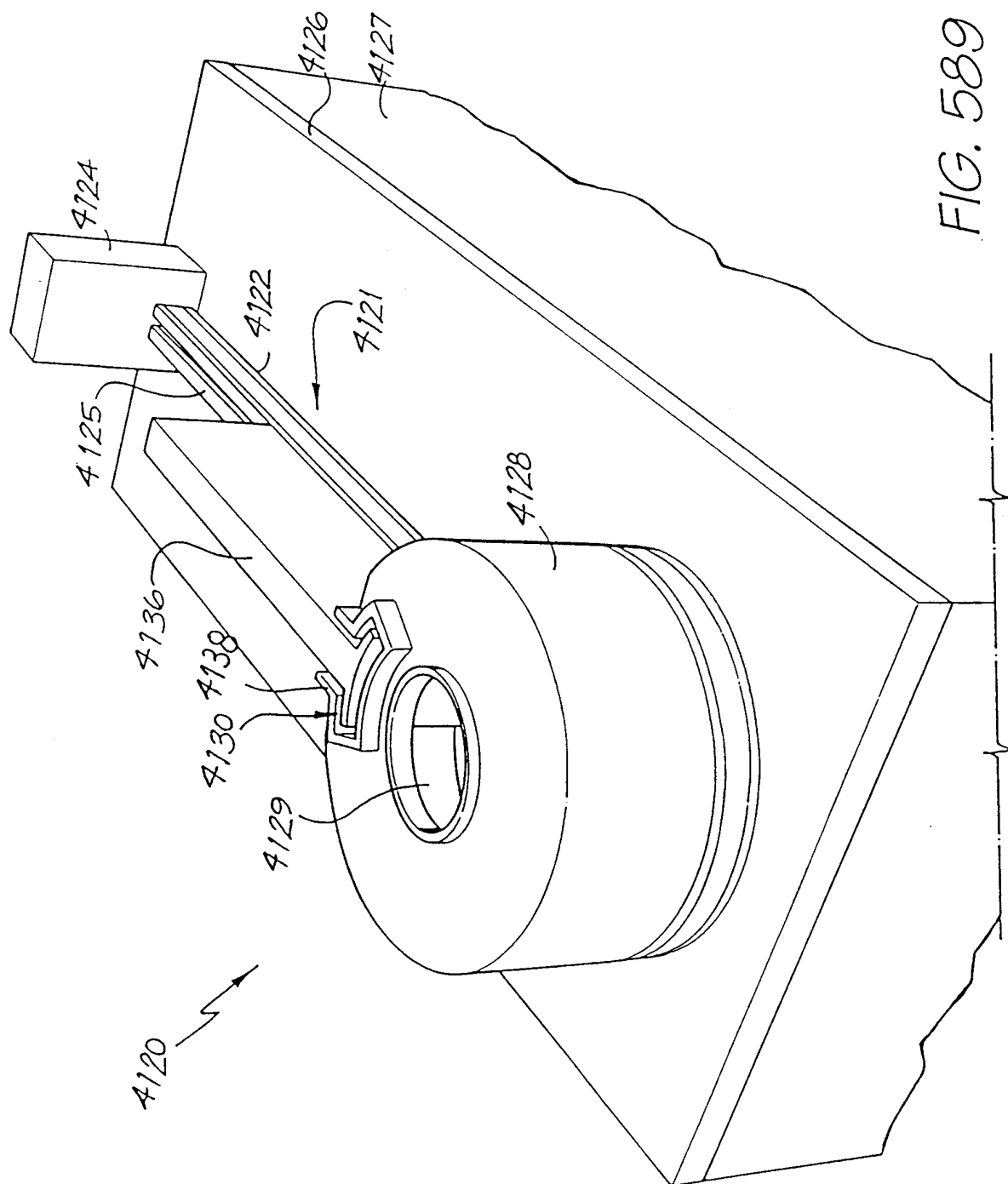


FIG. 588

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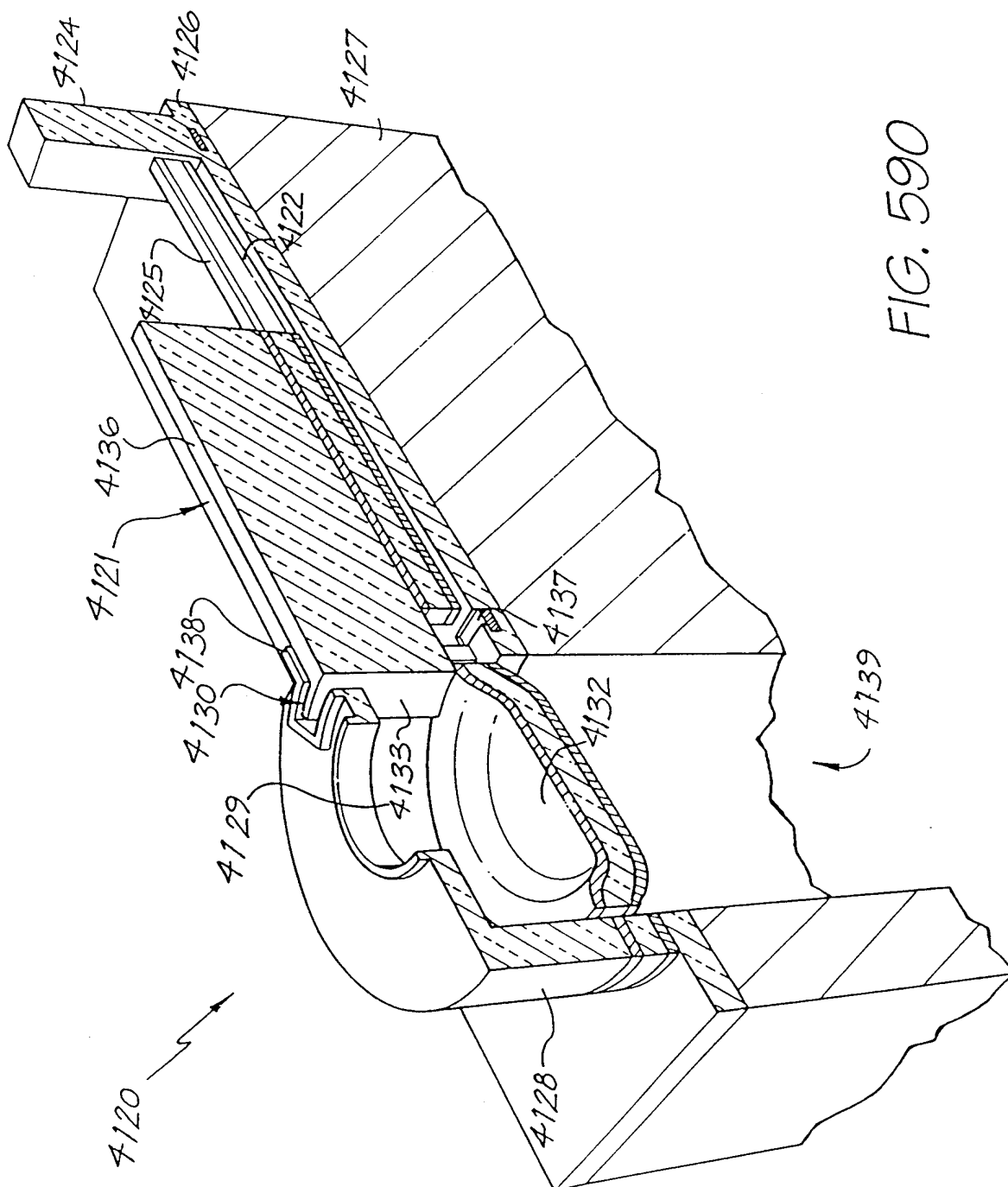


FIG. 590

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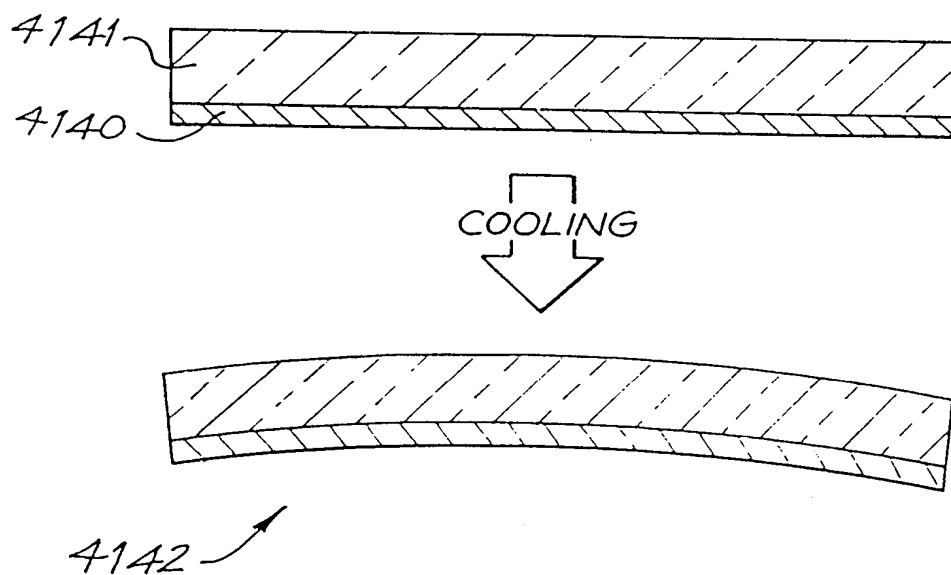


FIG. 591

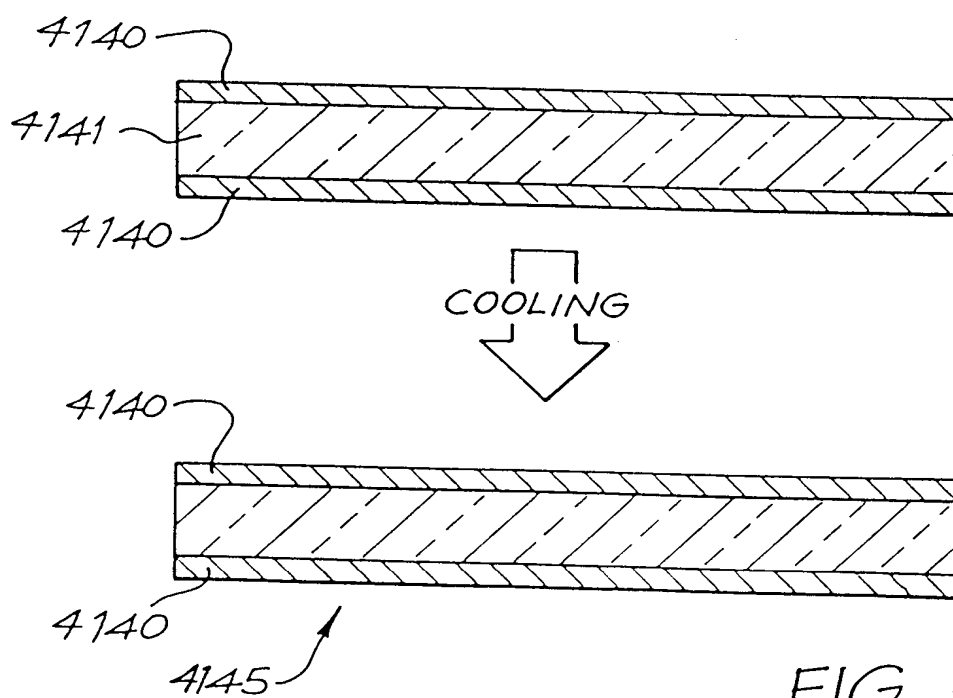
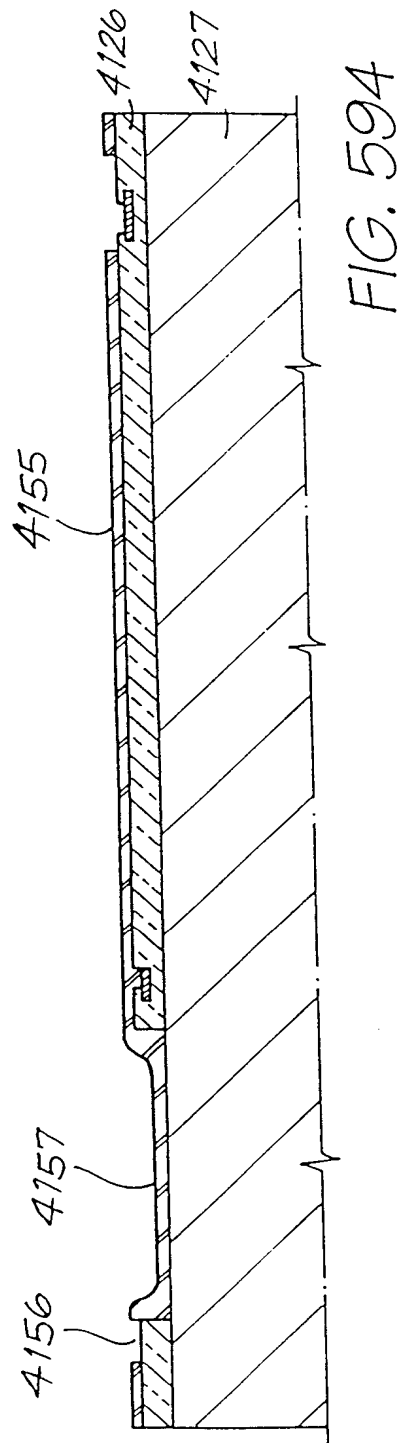
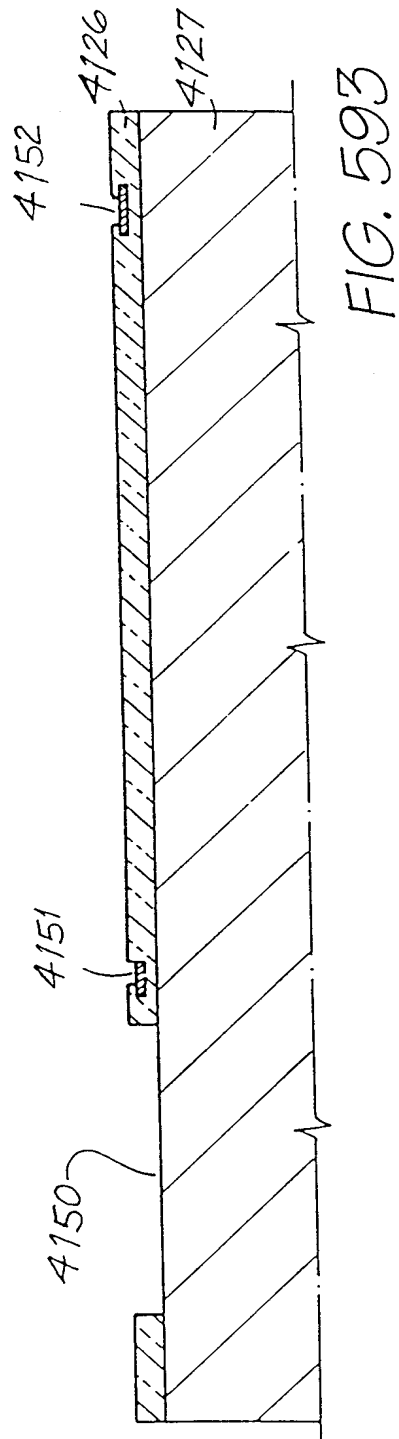


FIG. 592

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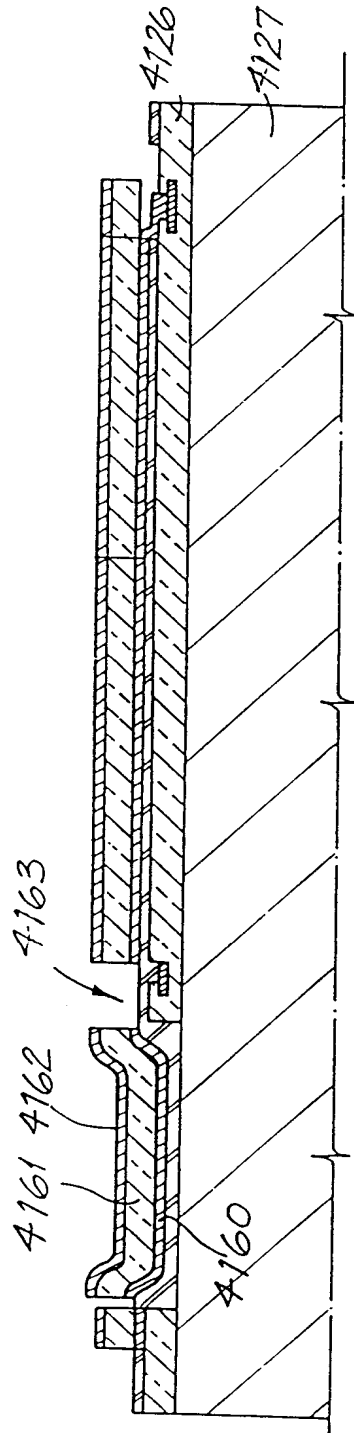


FIG. 595

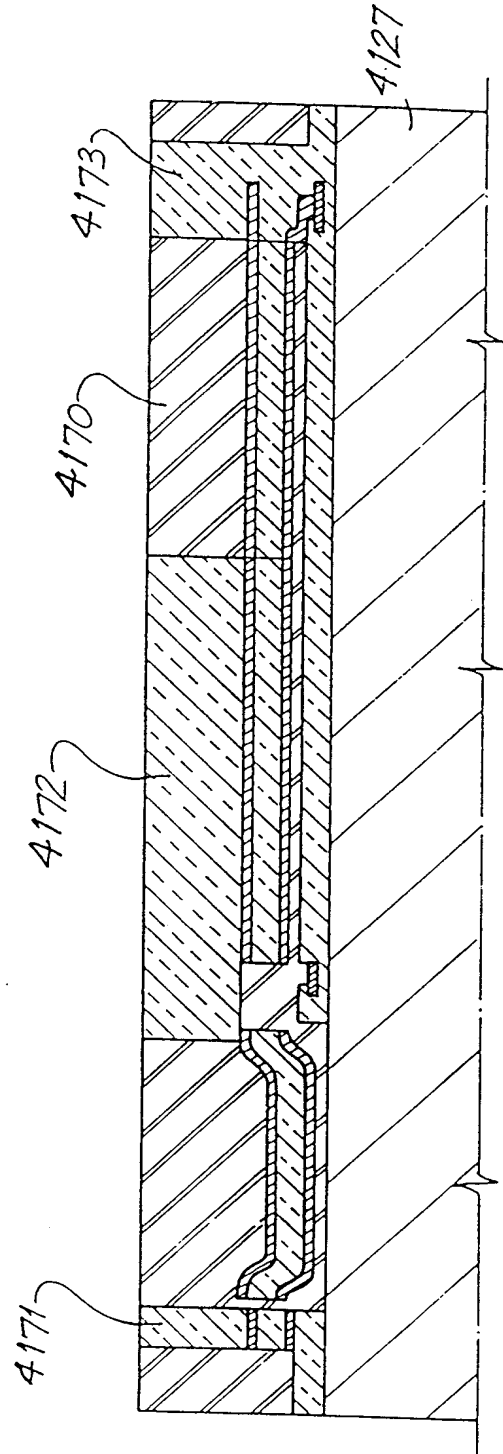


FIG. 596

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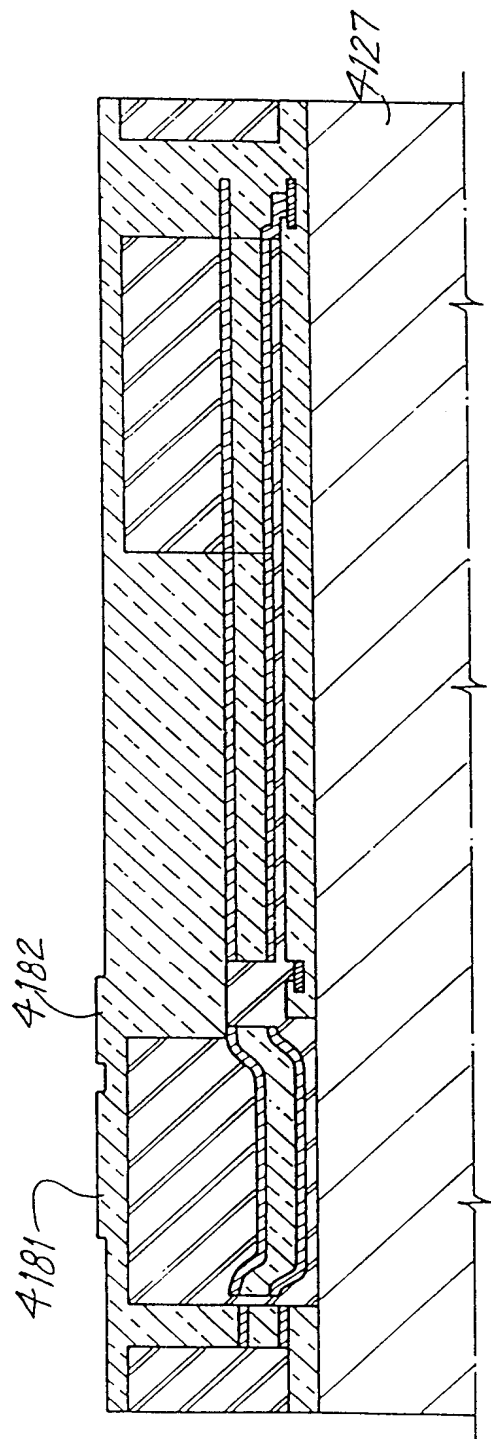


FIG. 597

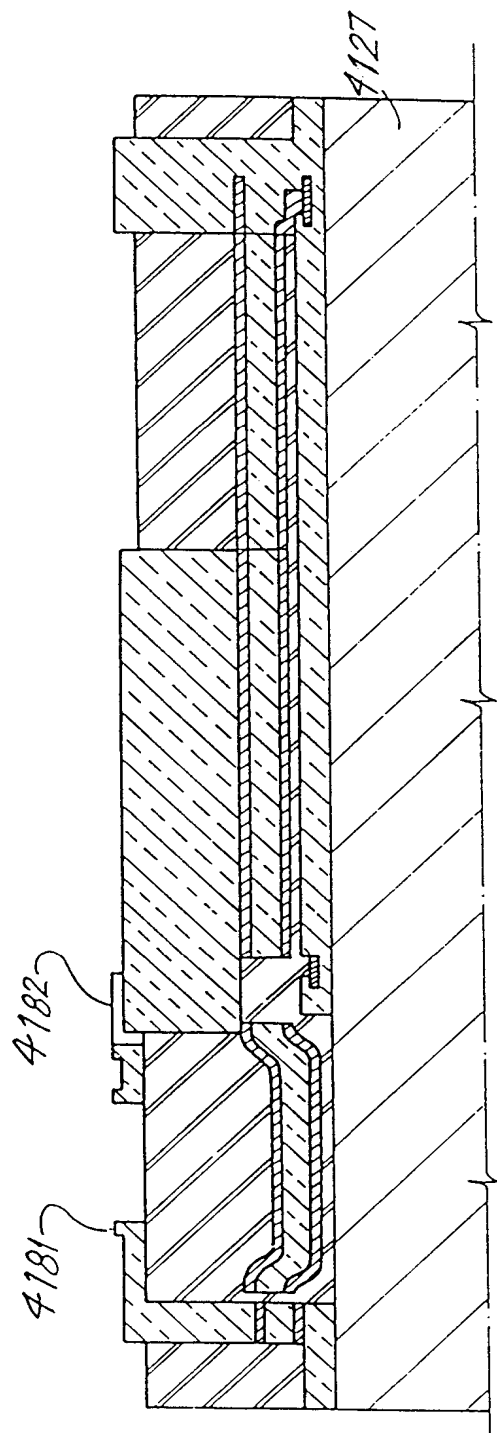


FIG. 598

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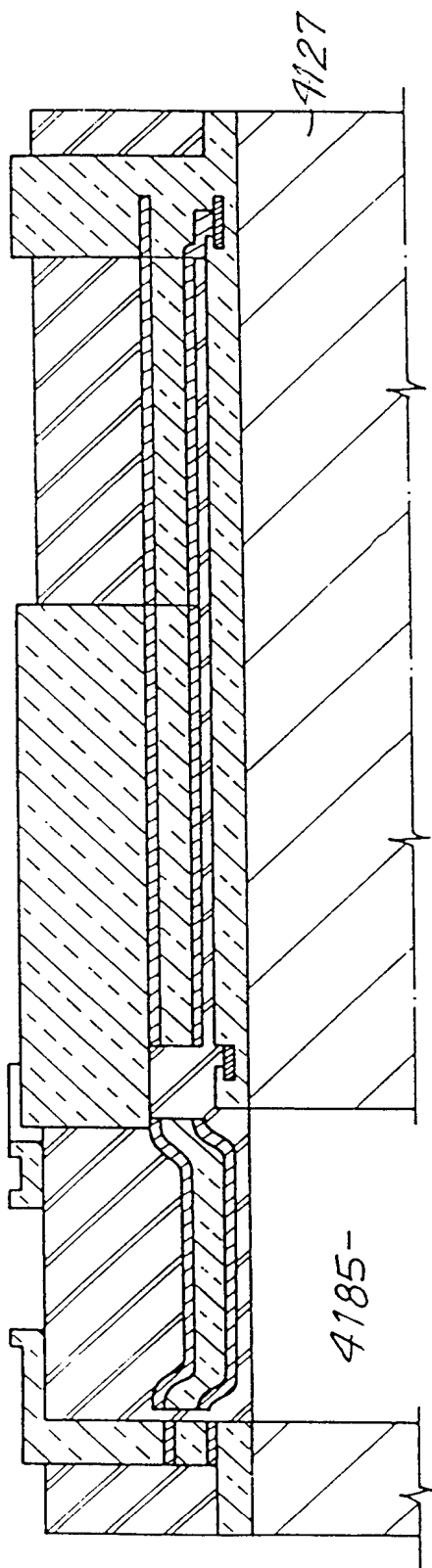


FIG. 599

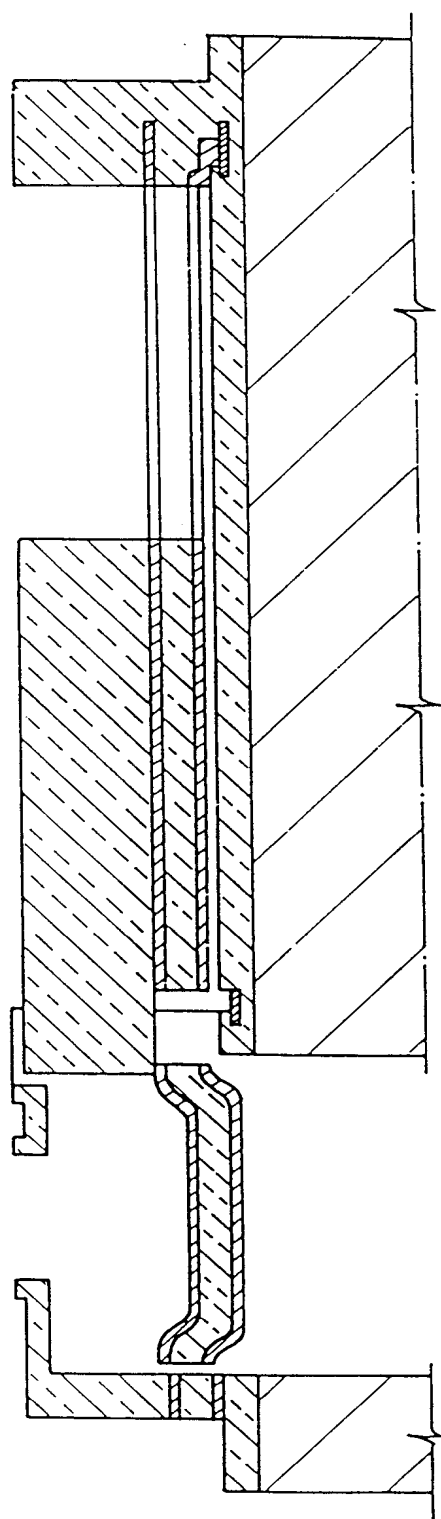


FIG. 600

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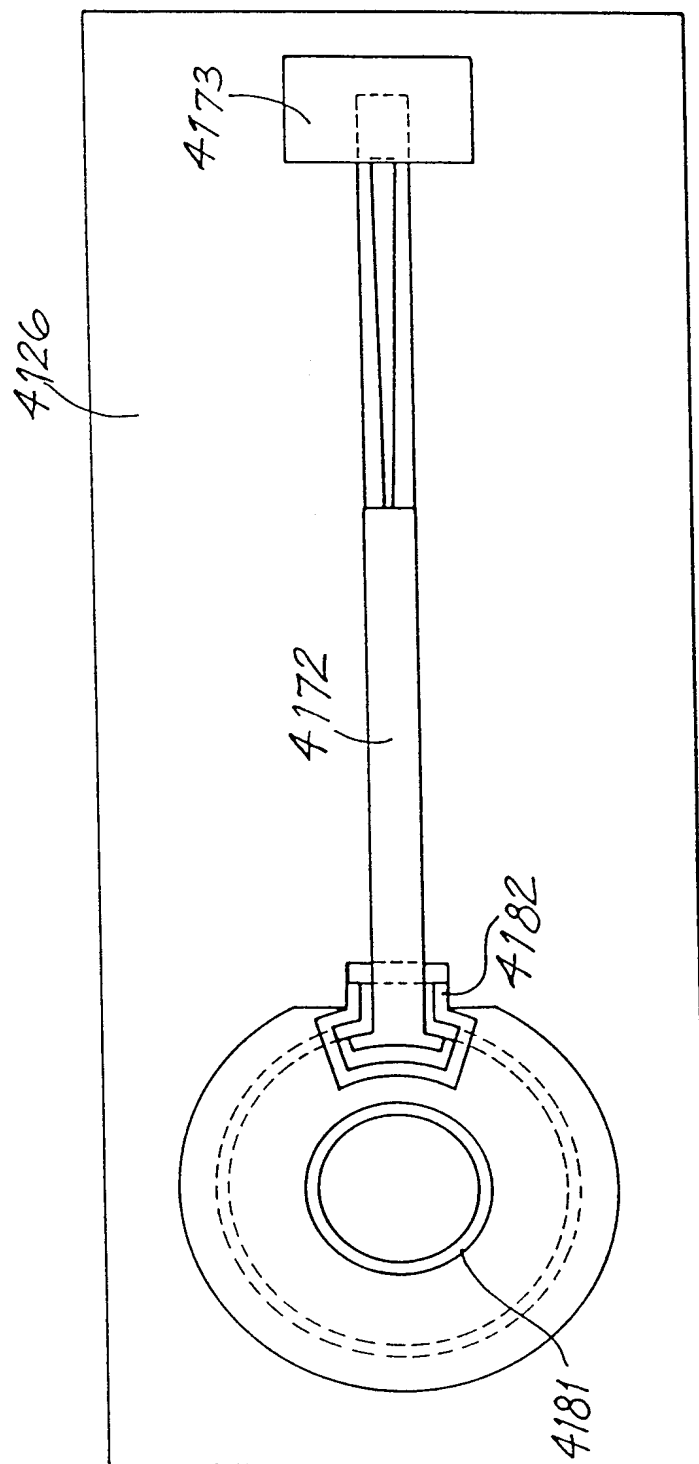
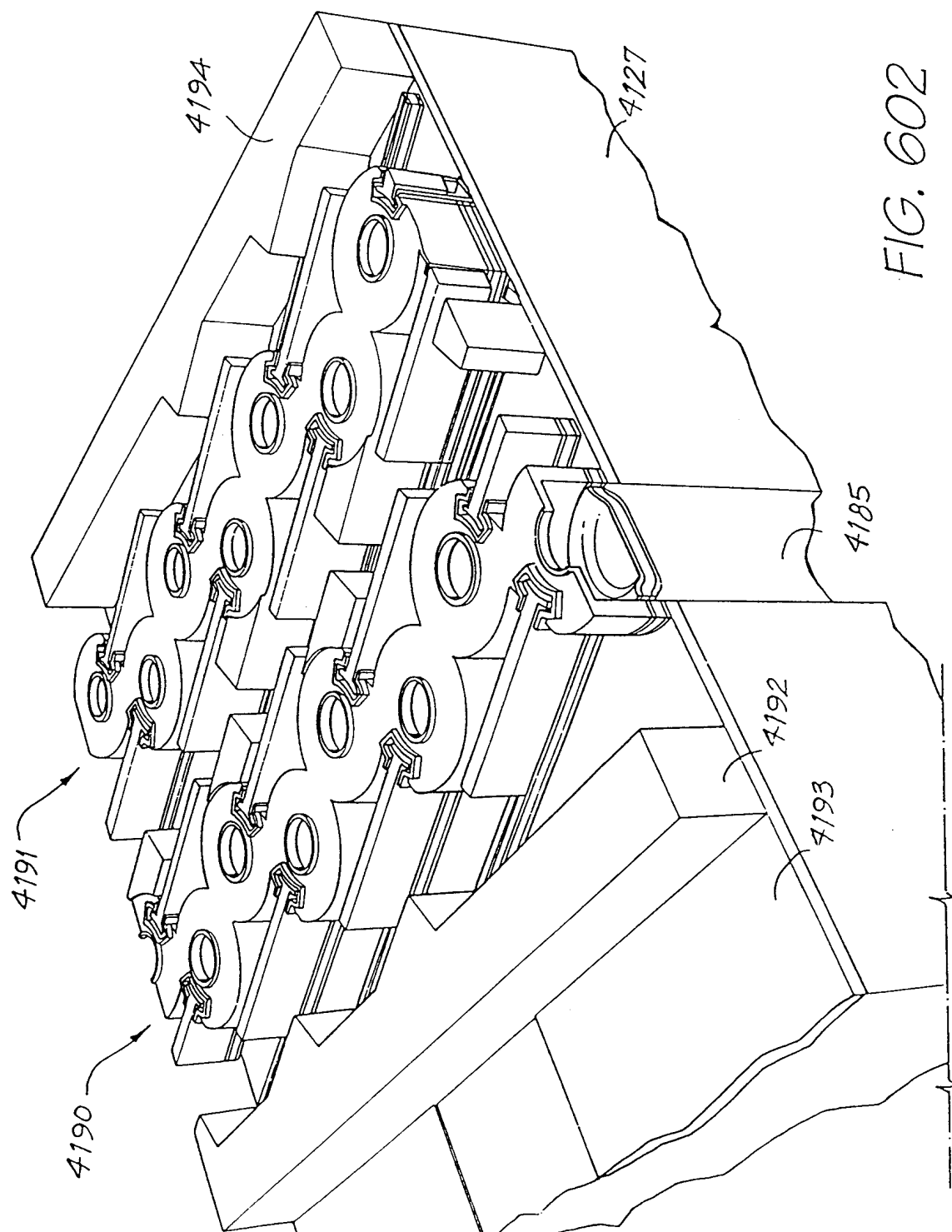


FIG. 601

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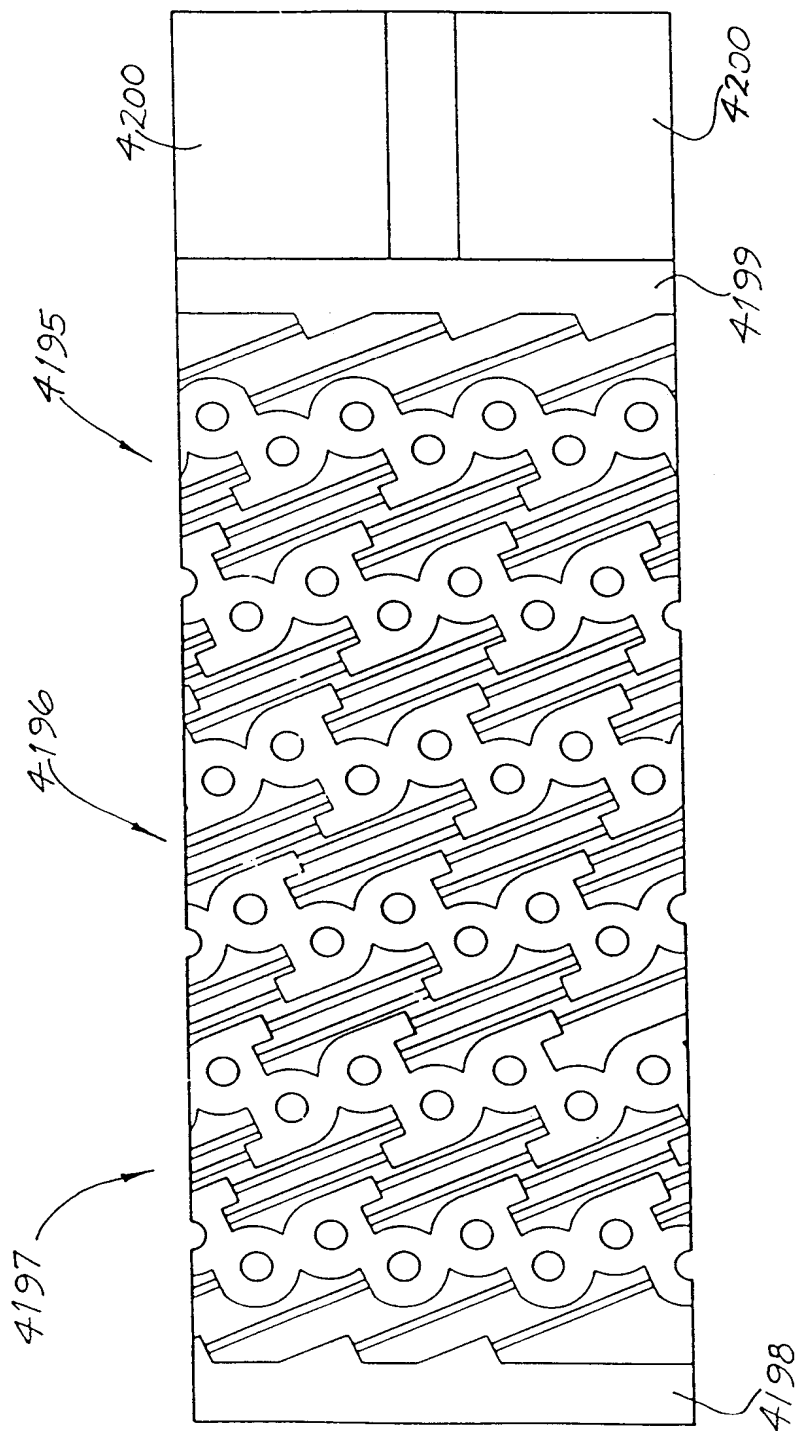
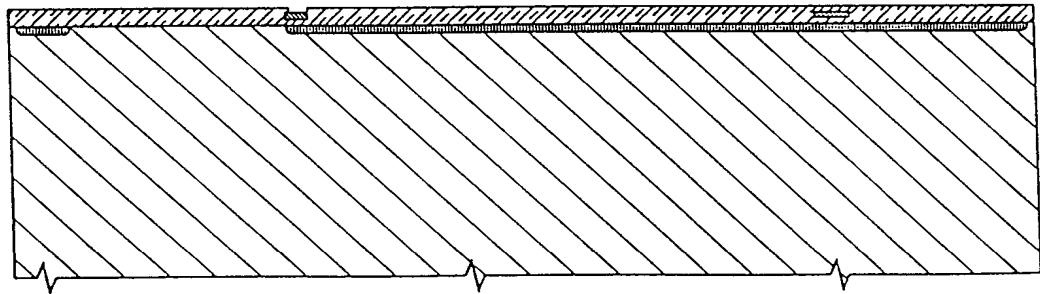
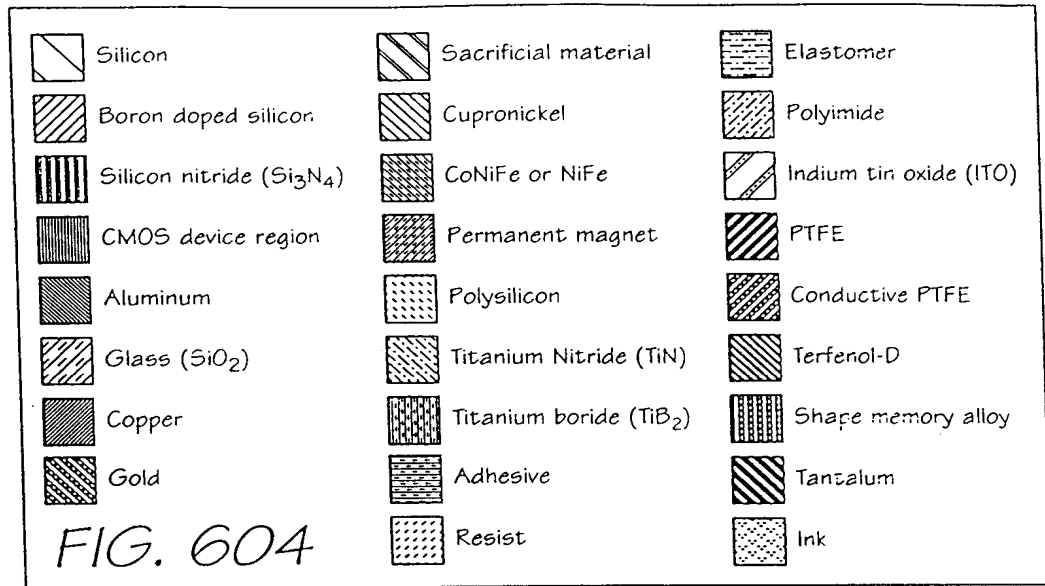
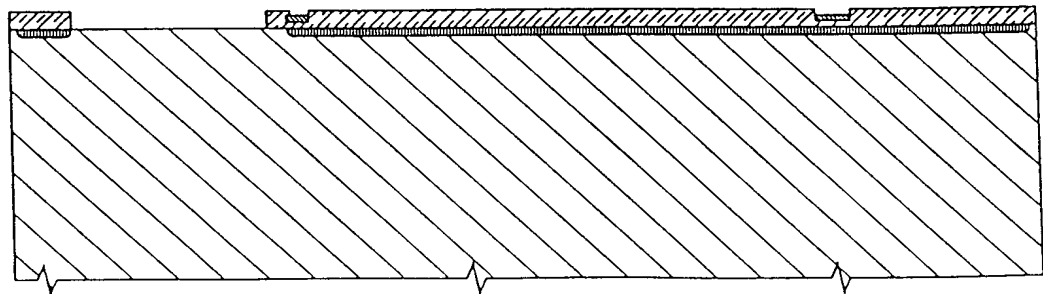


FIG. 603

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*FIG. 605**FIG. 606*

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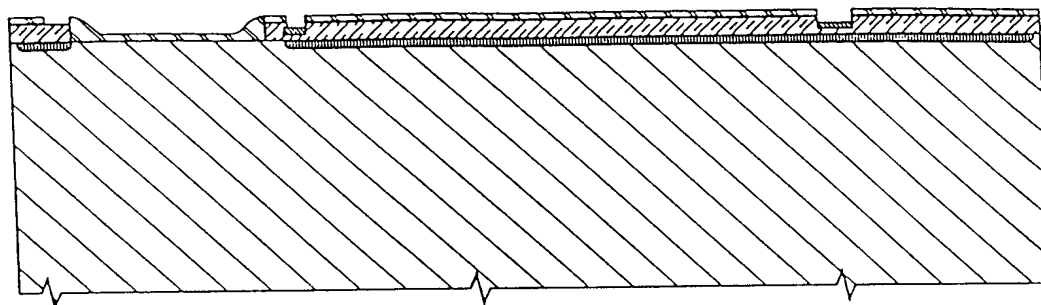


FIG. 607

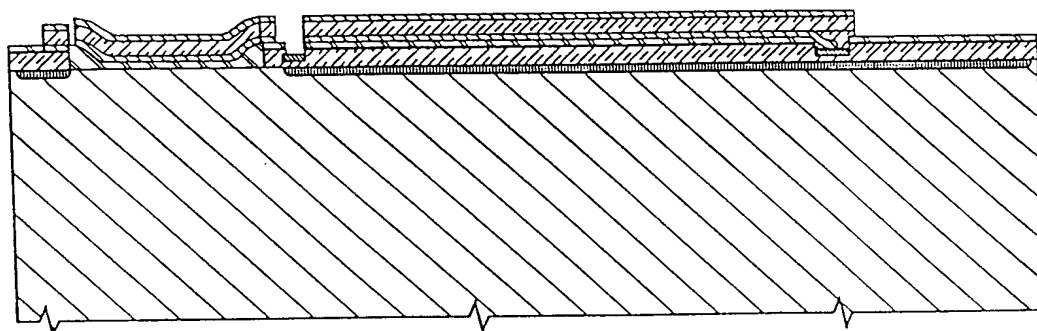


FIG. 608

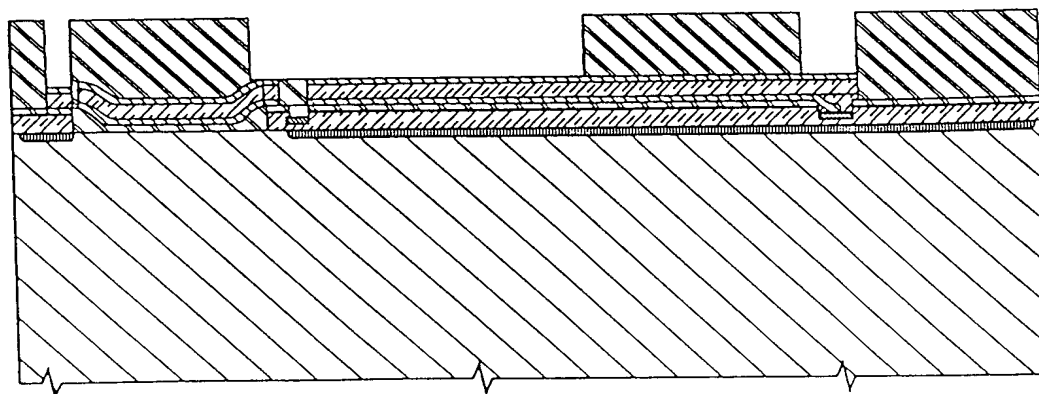


FIG. 609

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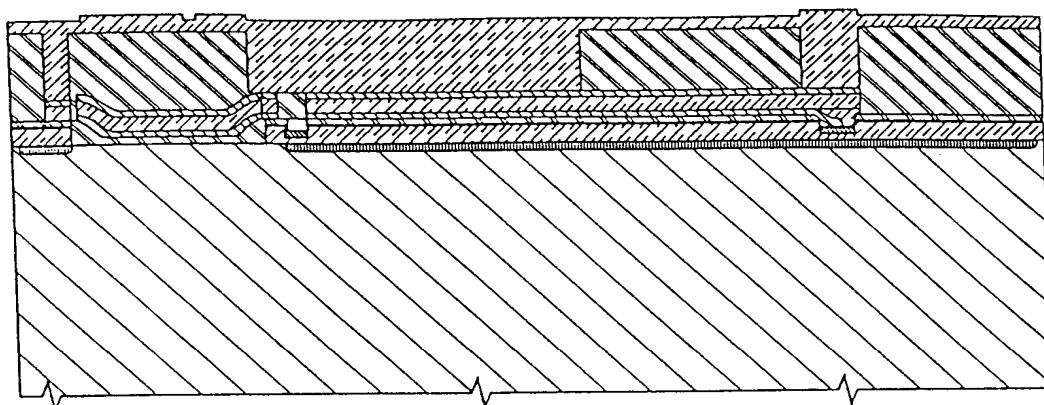


FIG. 610

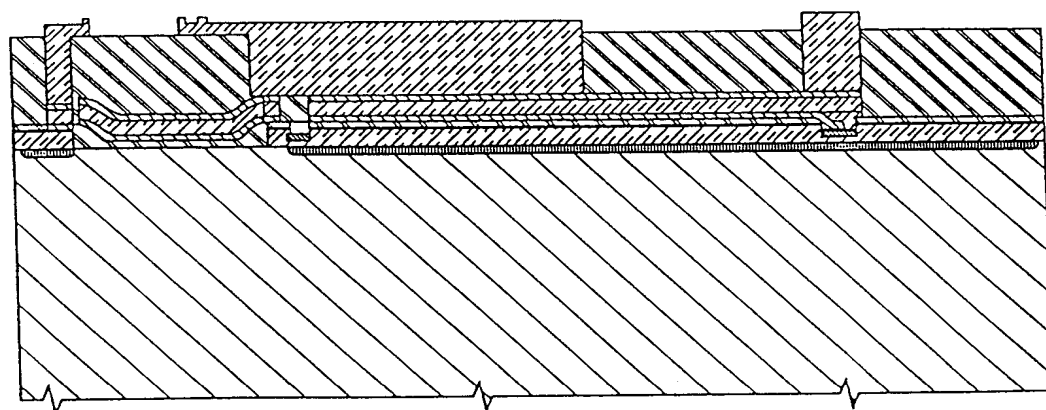


FIG. 611

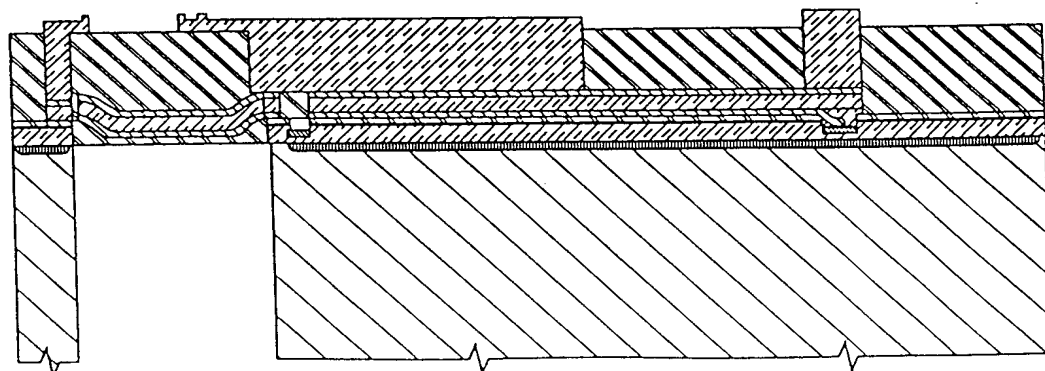


FIG. 612

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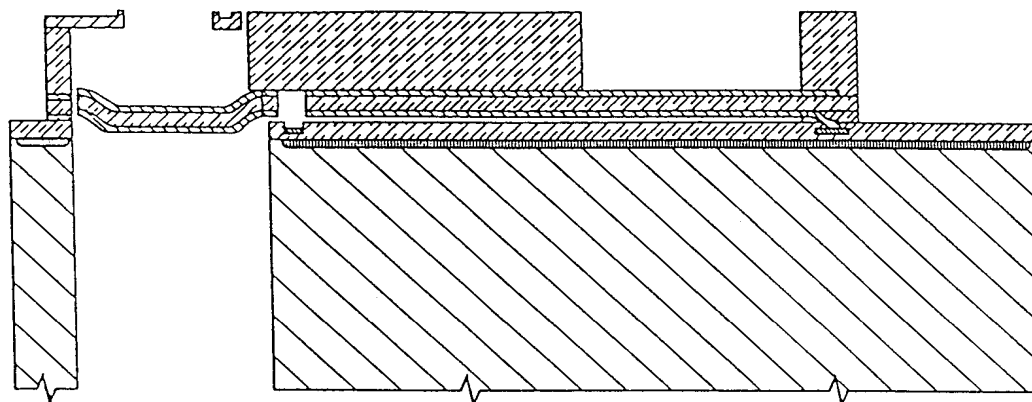


FIG. 613

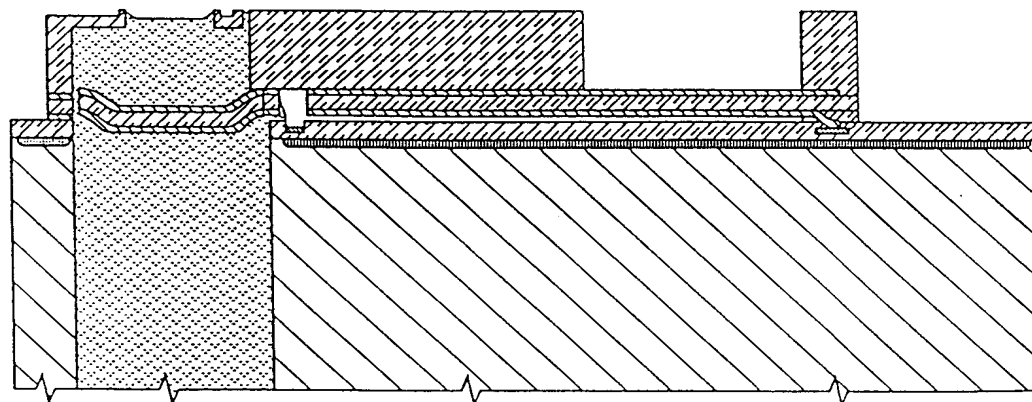


FIG. 614

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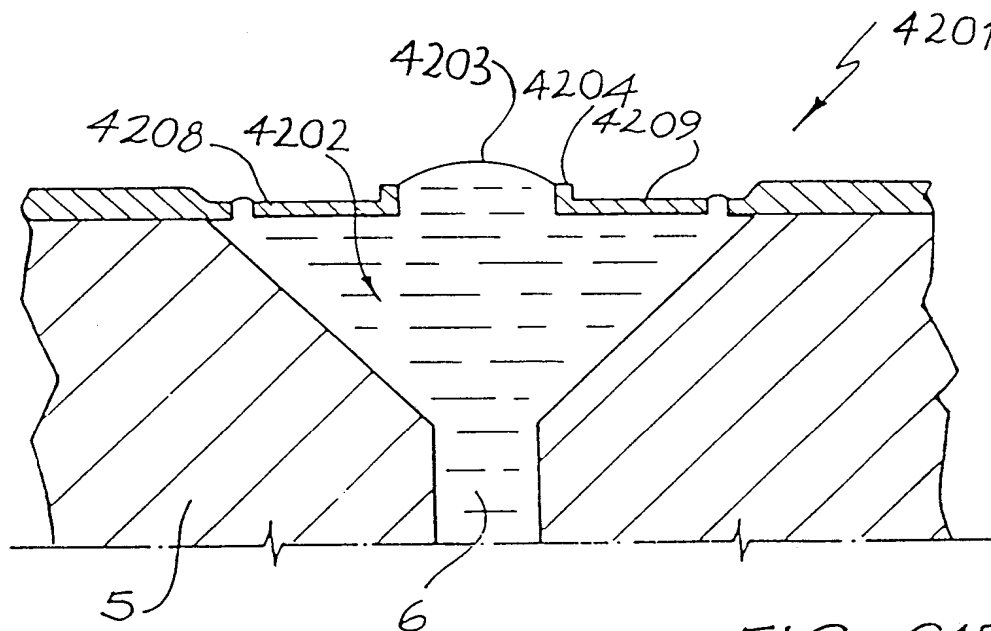


FIG. 615

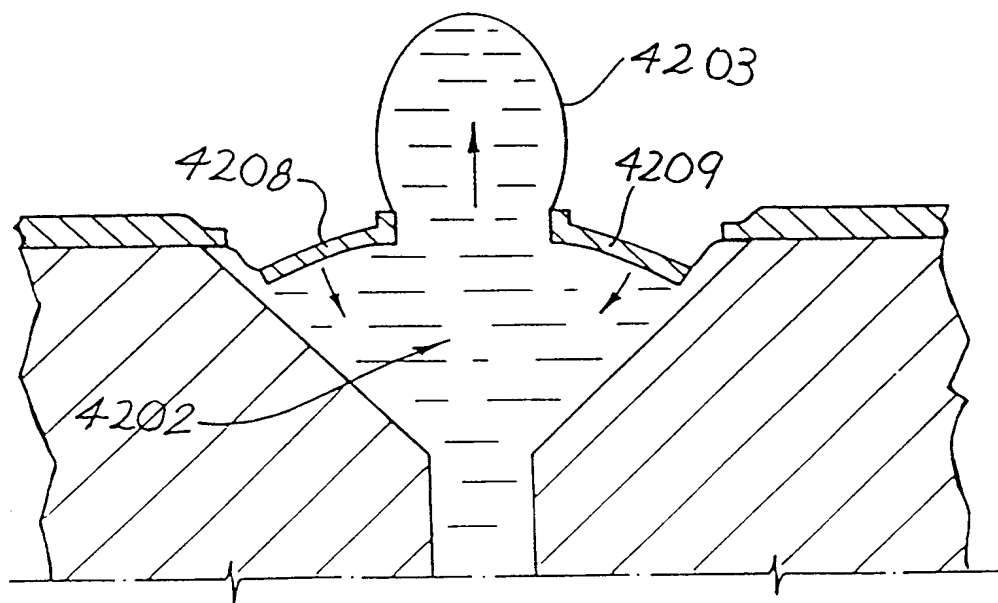


FIG. 616

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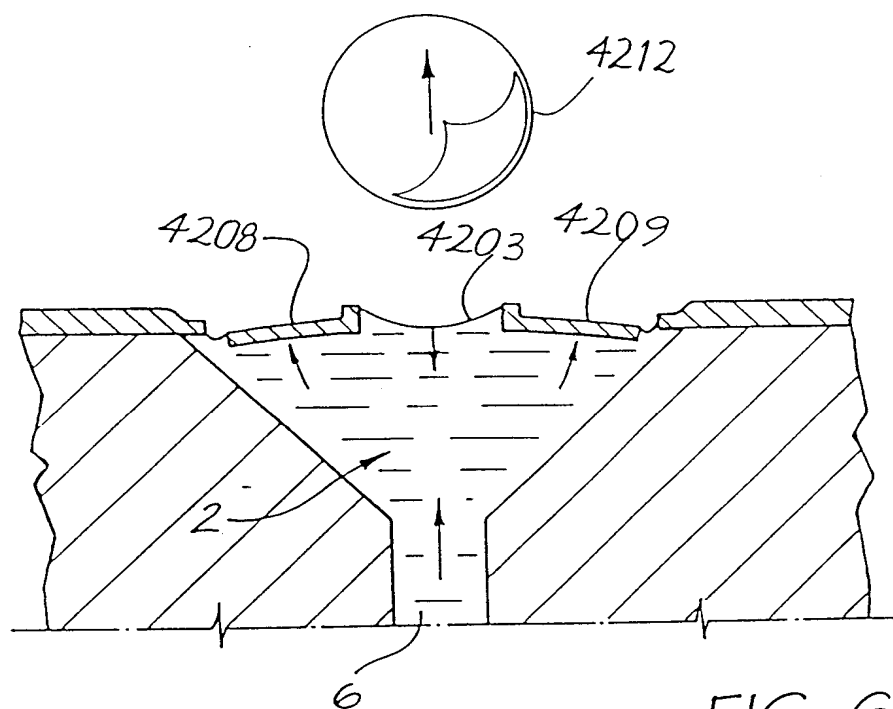


FIG. 617

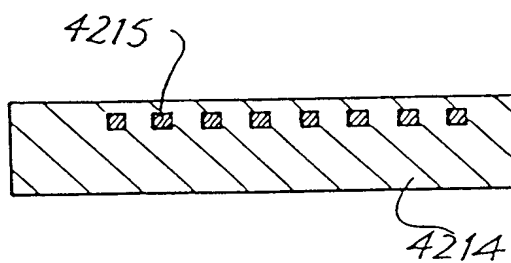


FIG. 618a

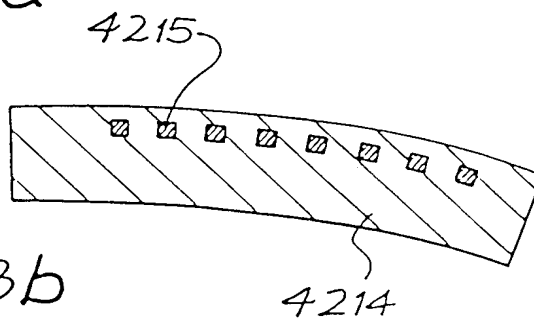
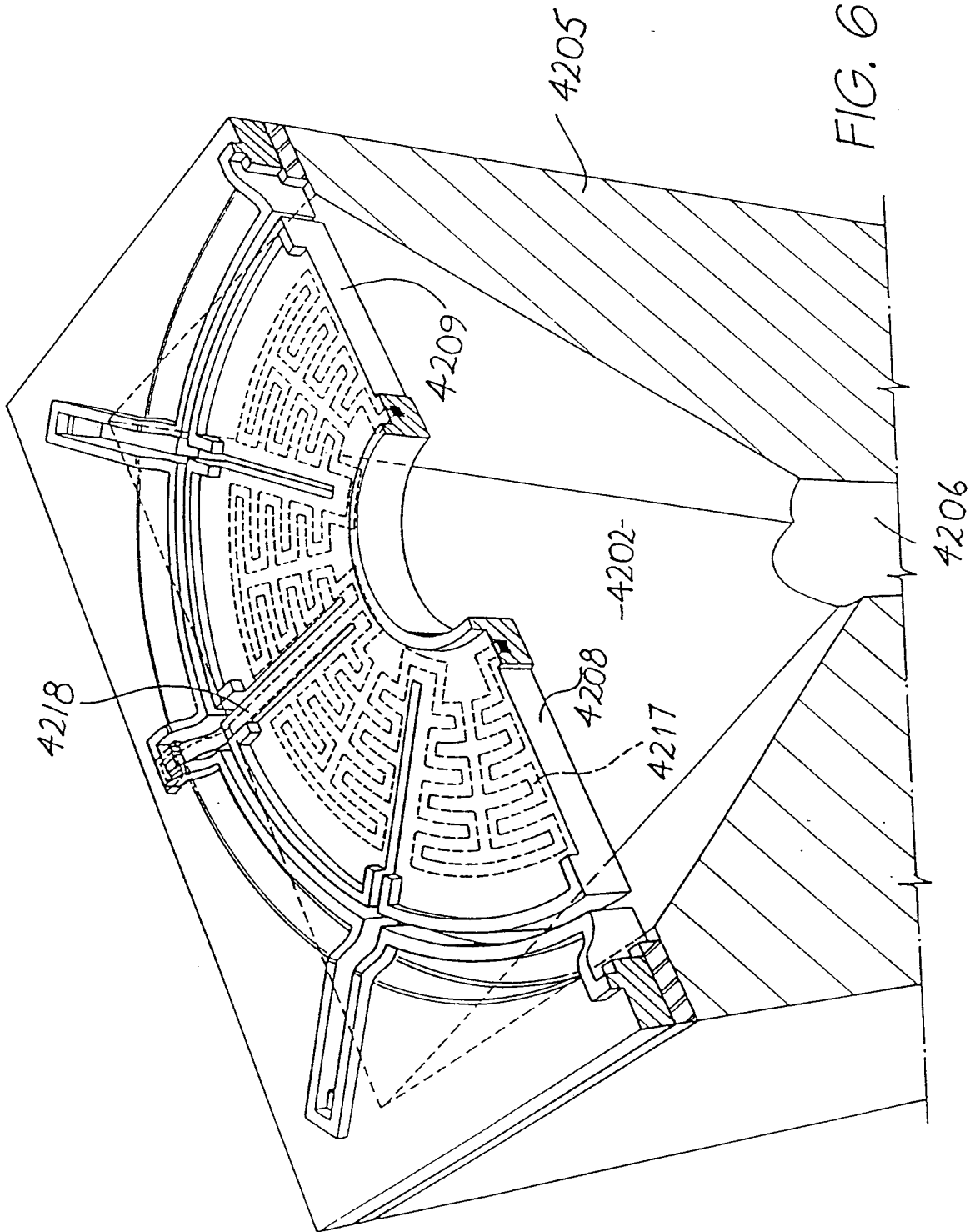


FIG. 618b

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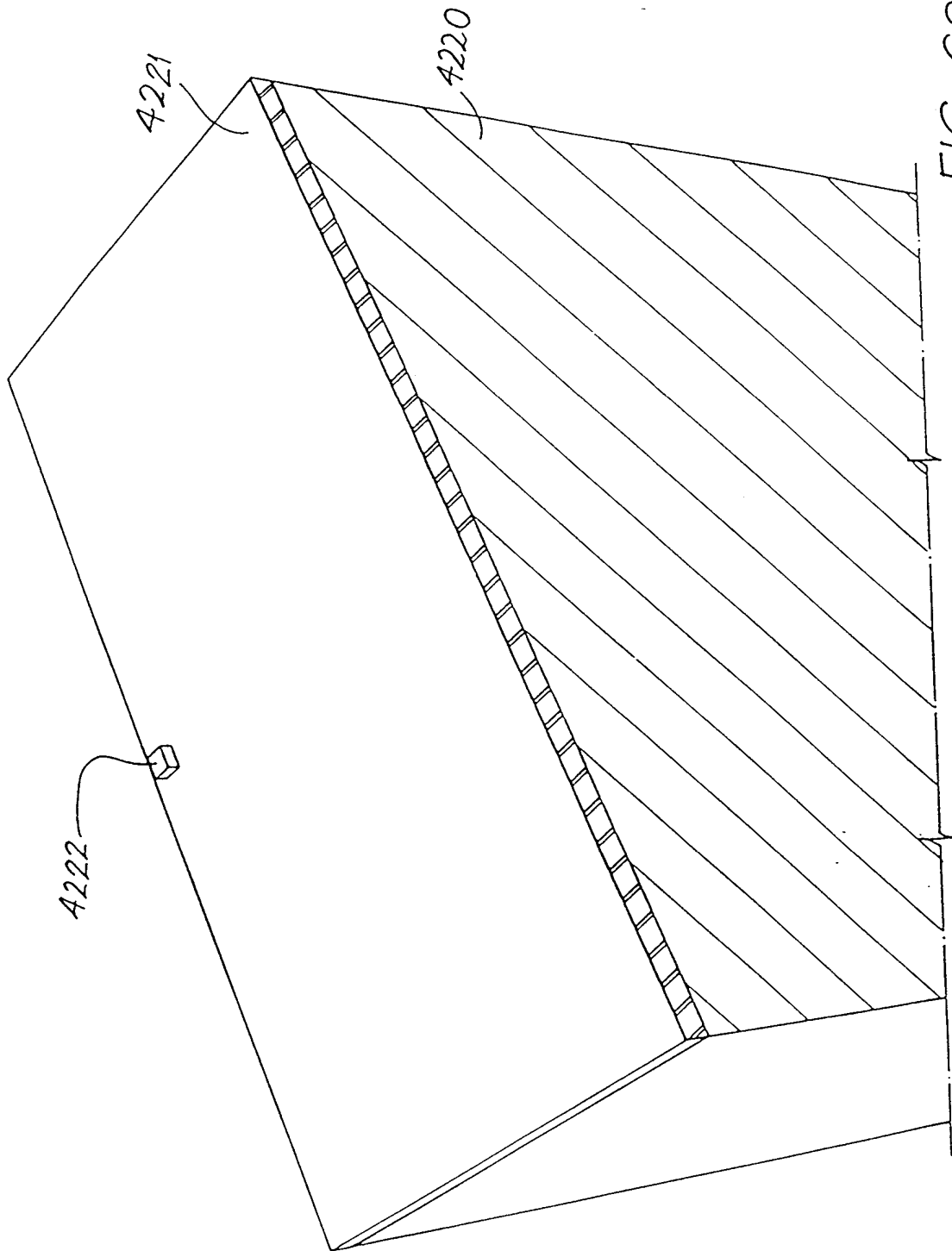
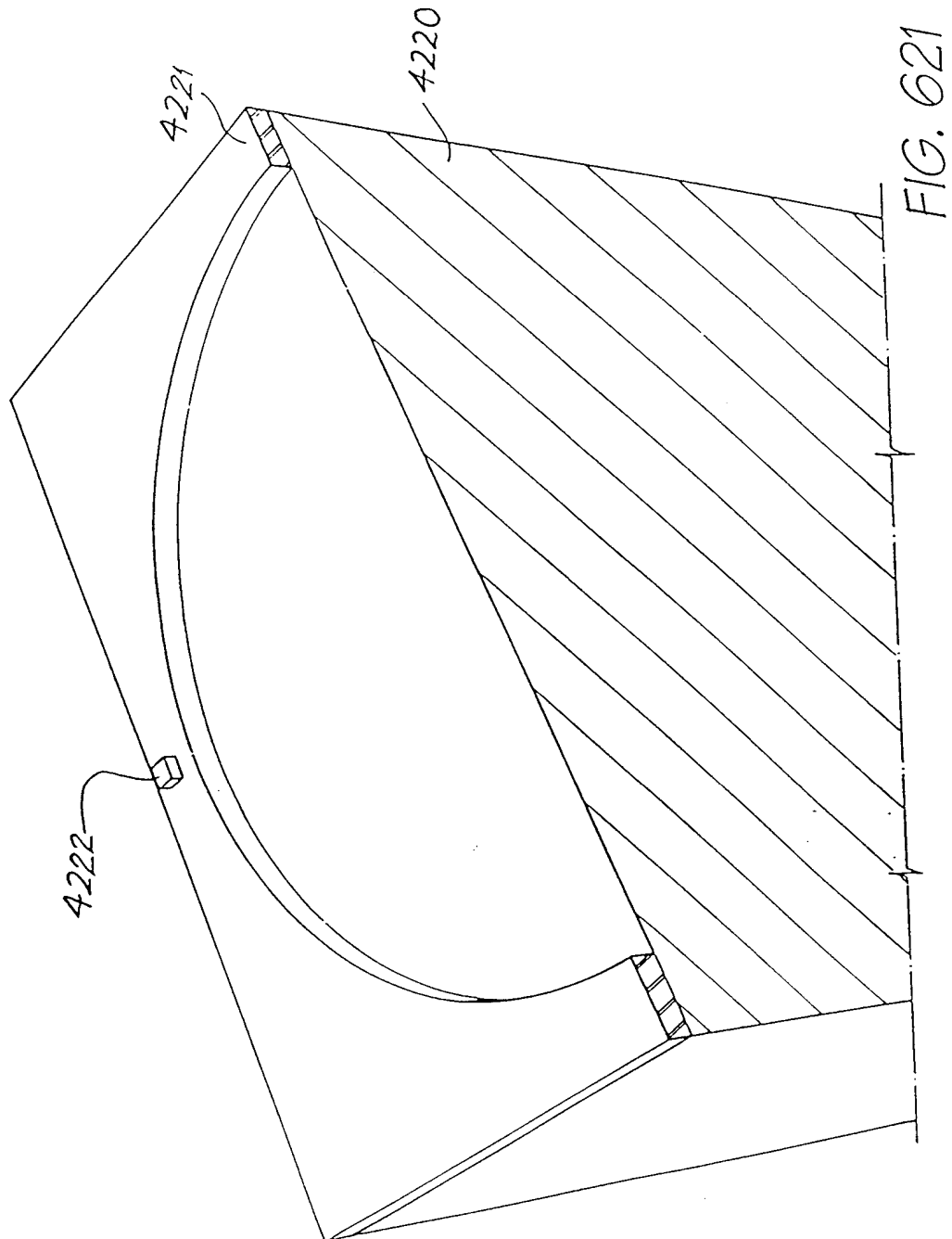


FIG. 620

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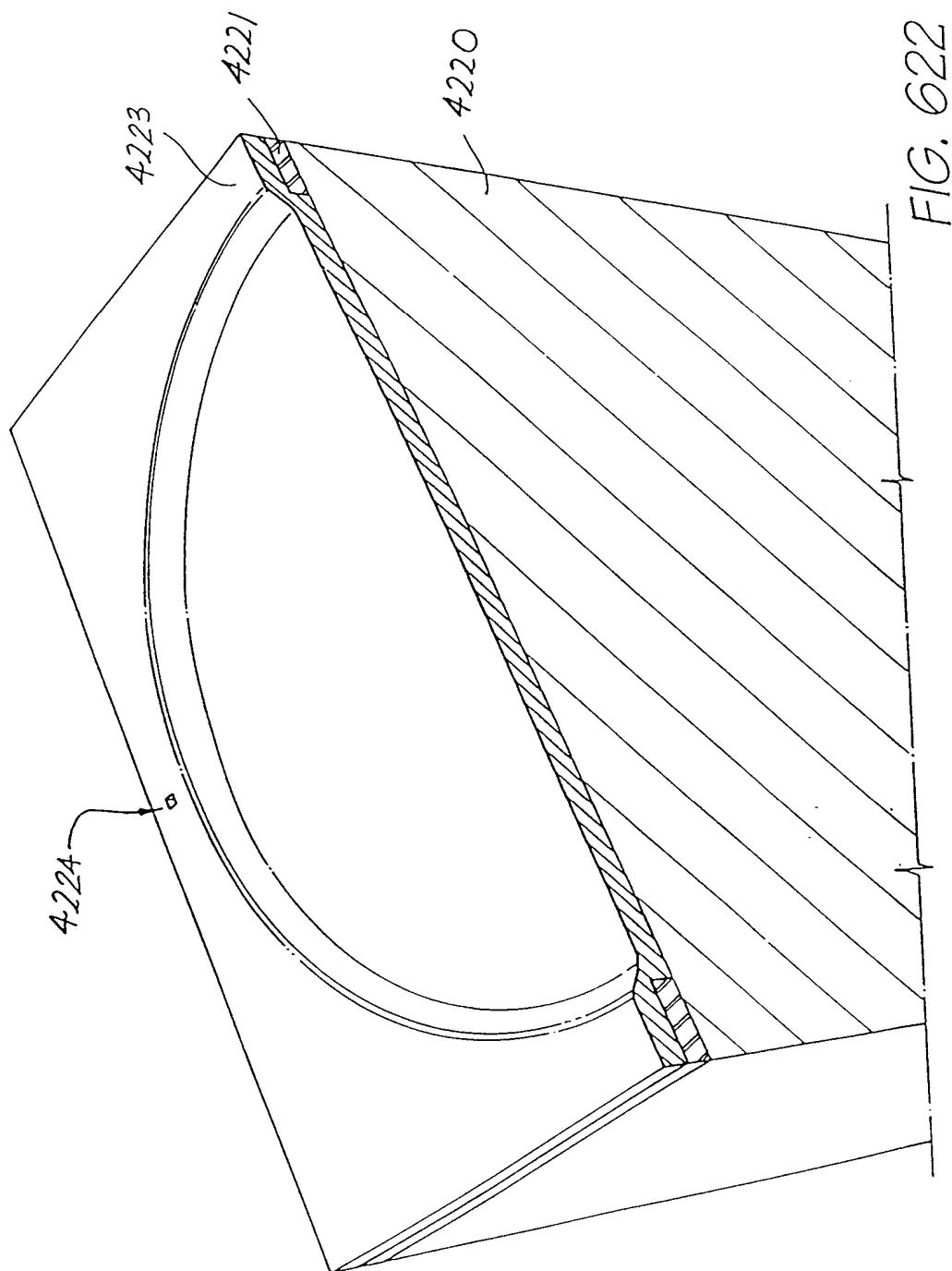
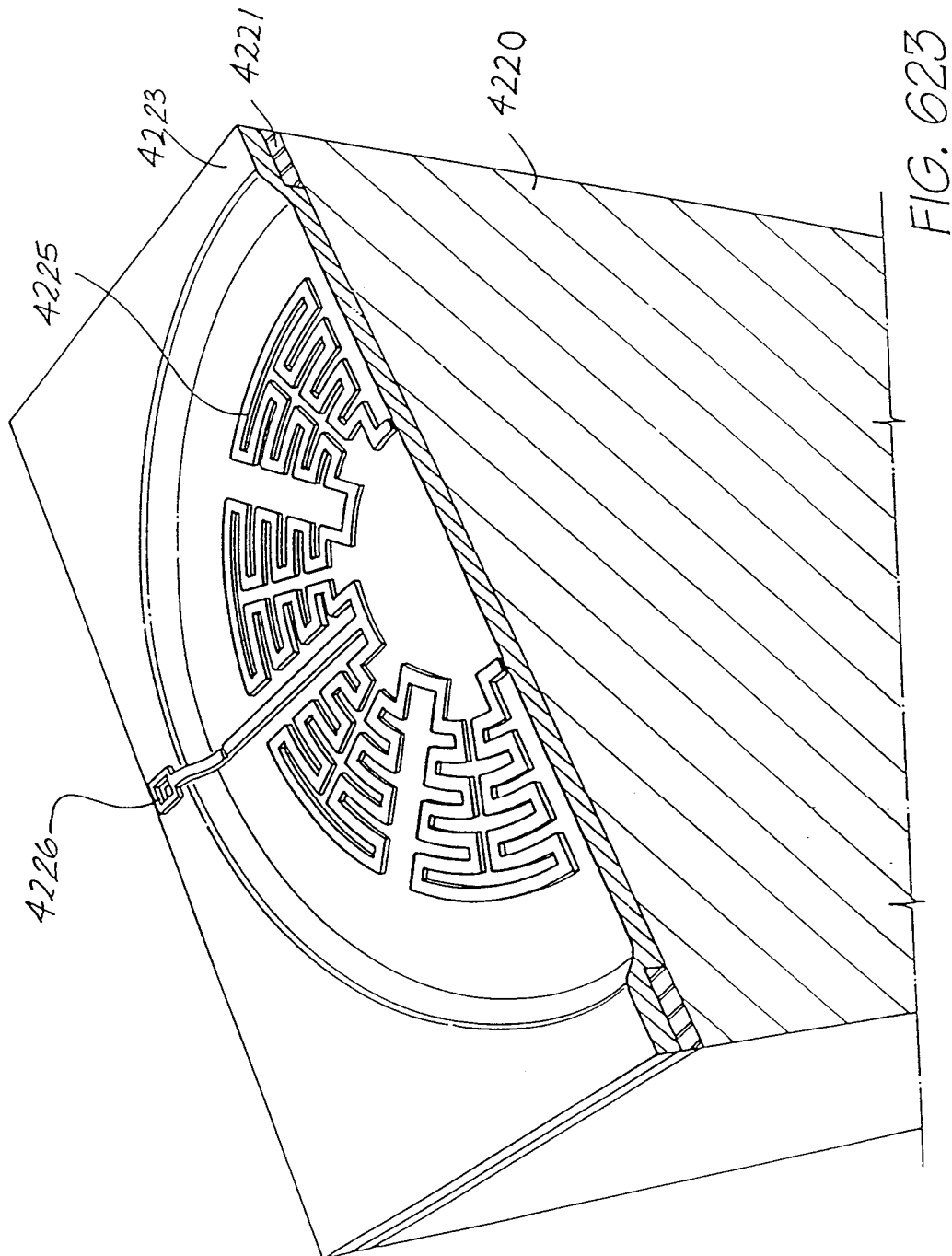
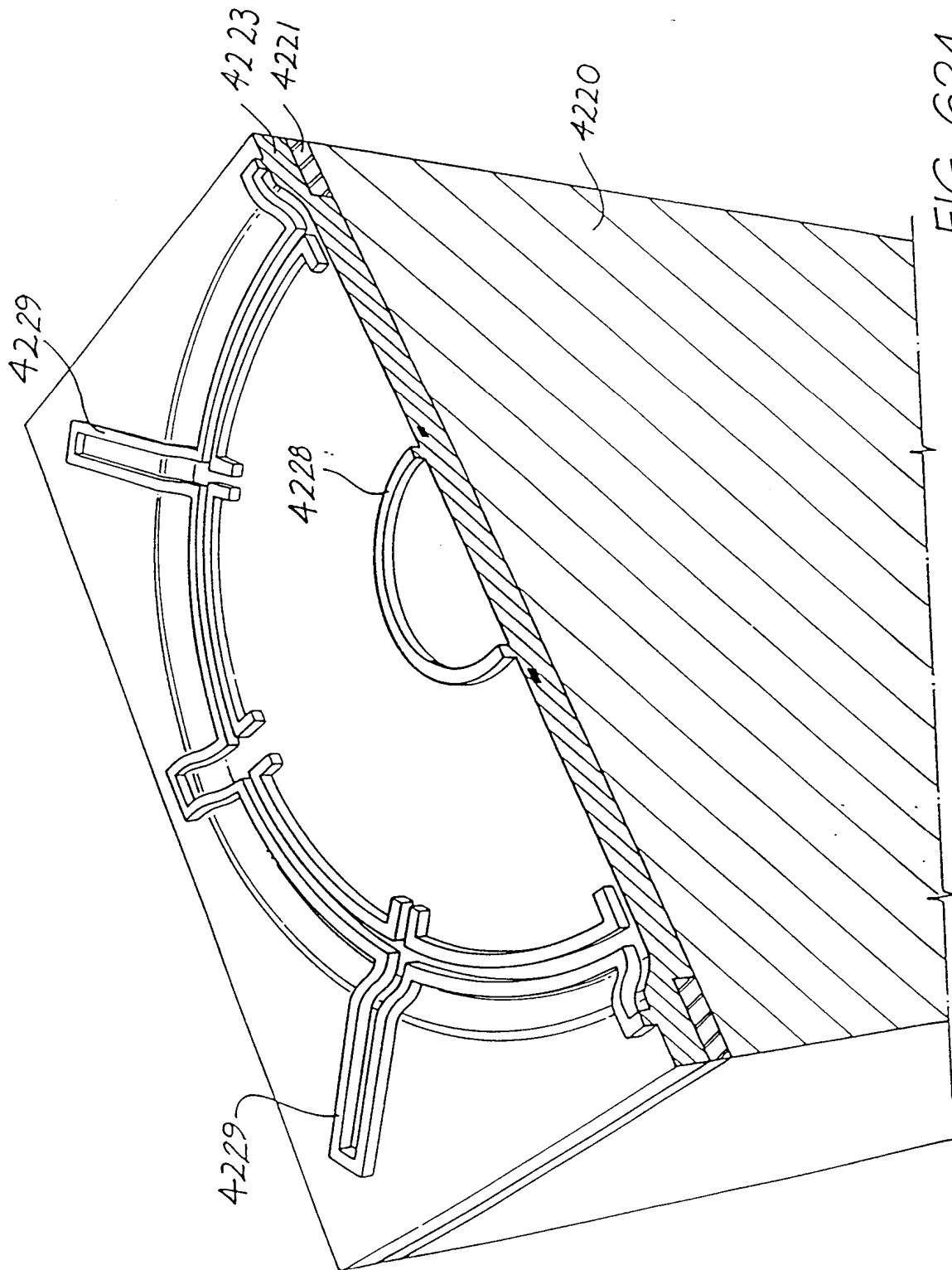


FIG. 622

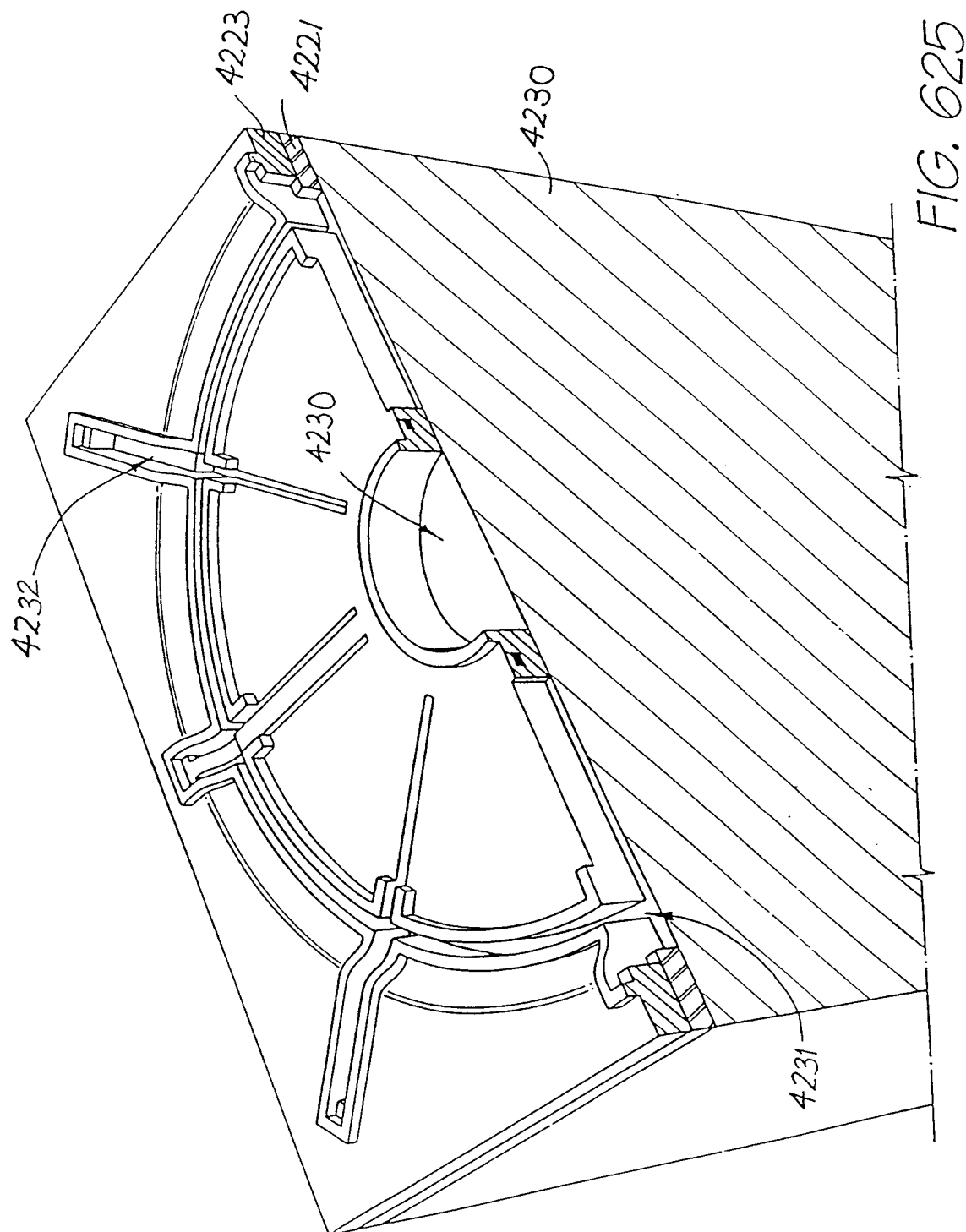
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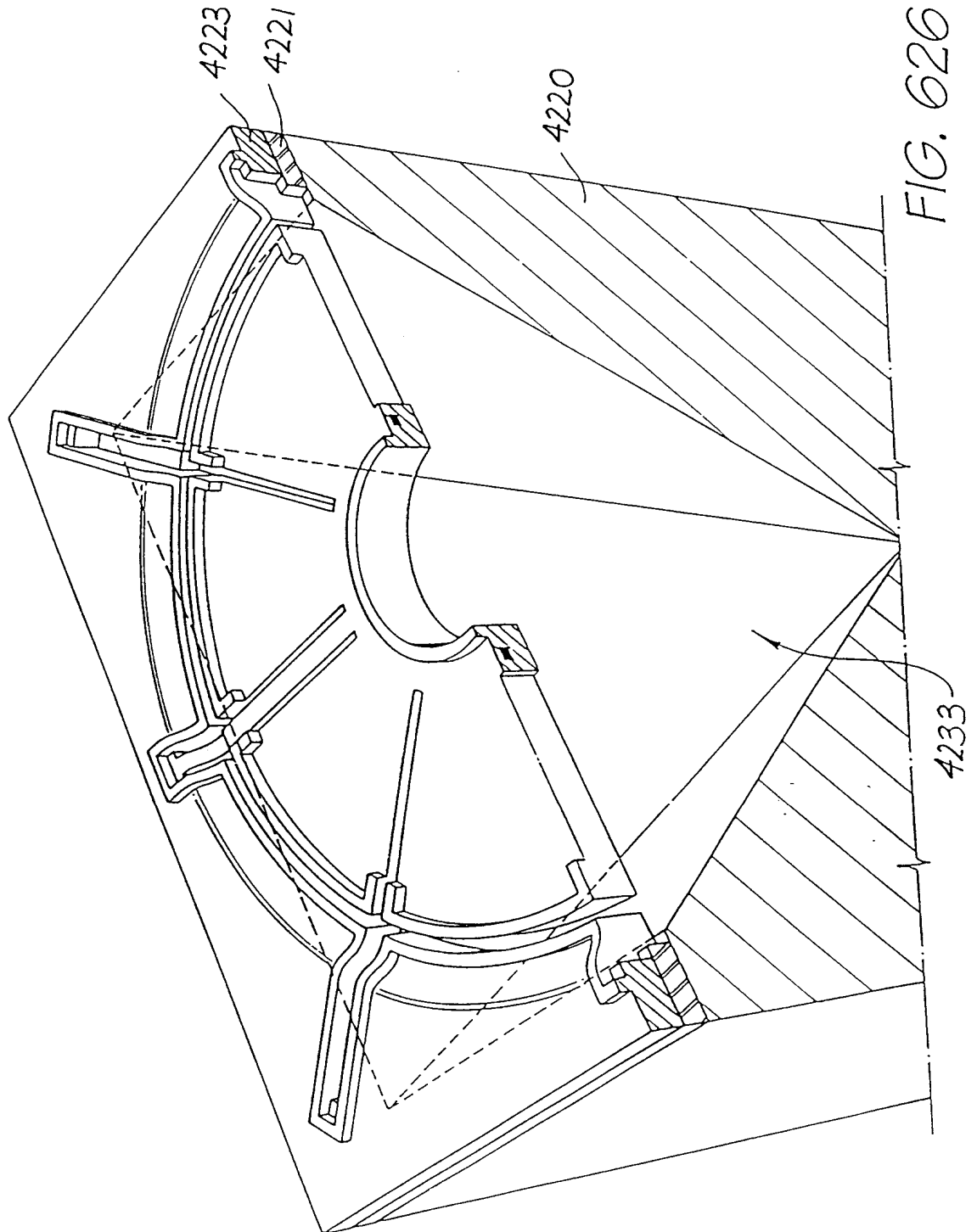
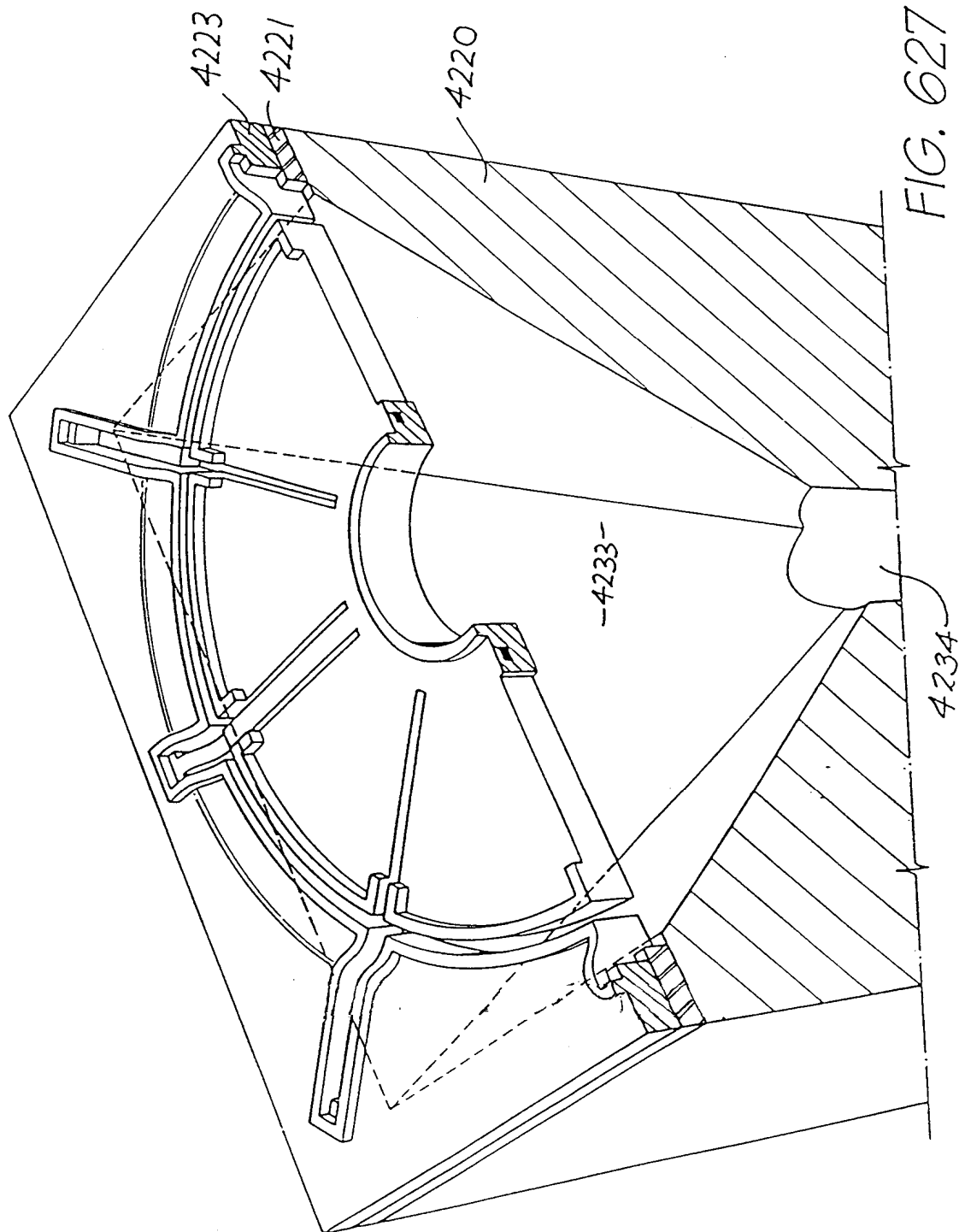
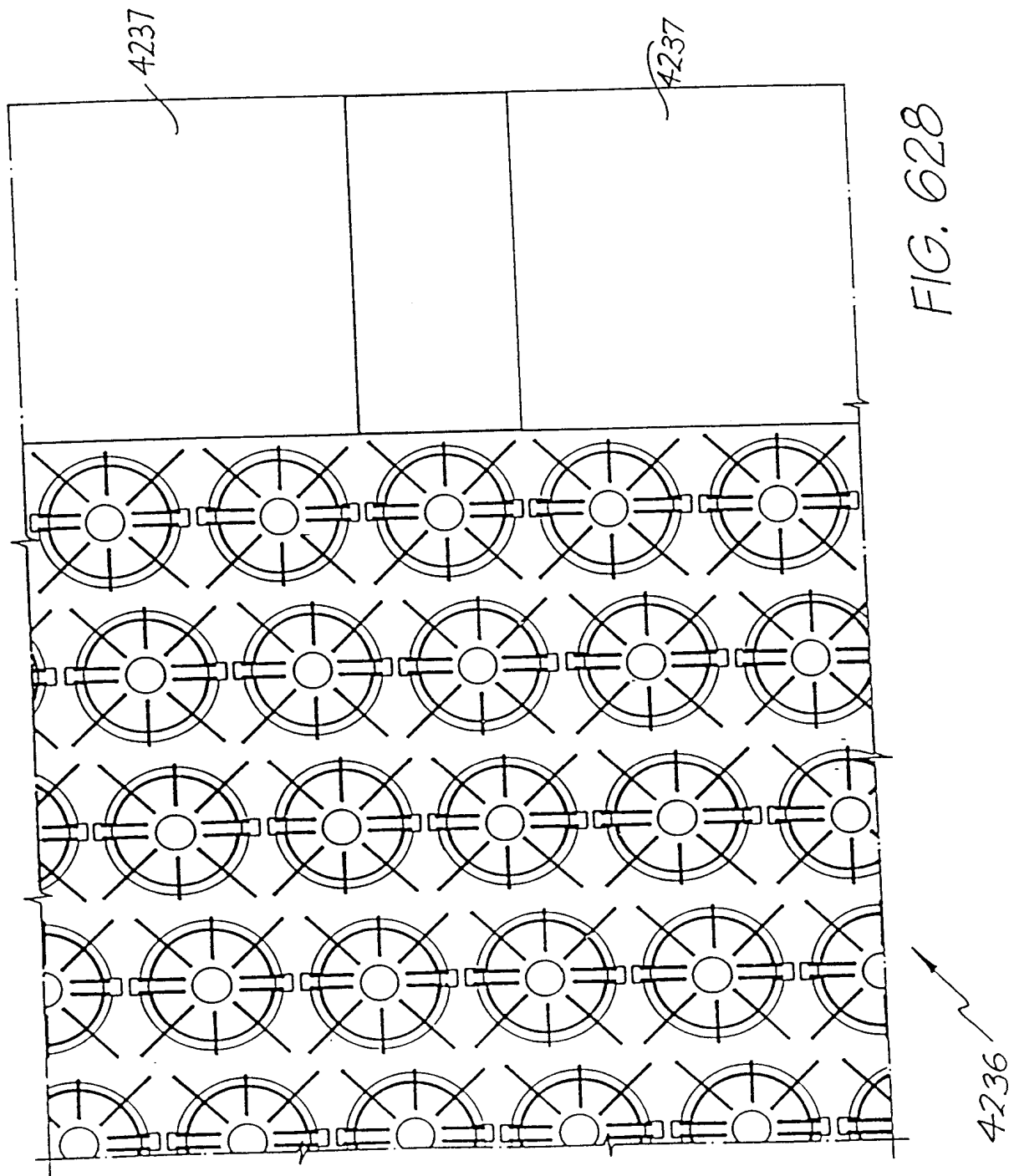


FIG. 626

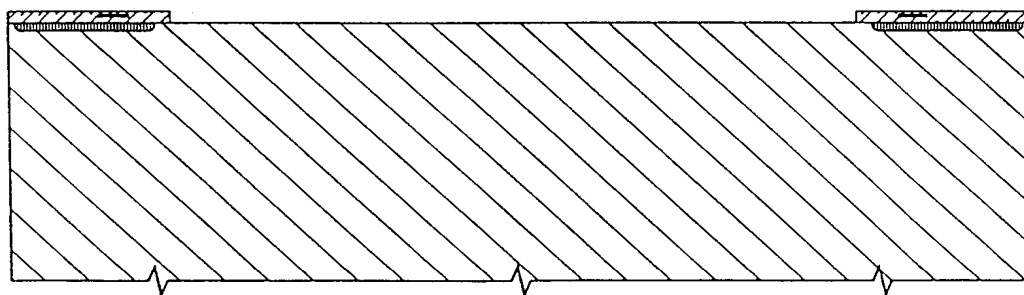
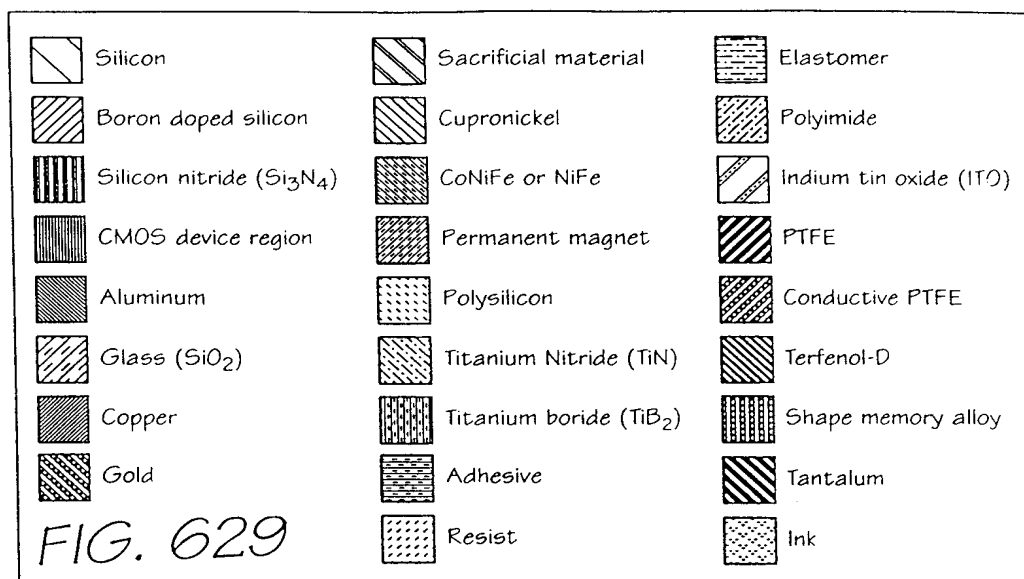
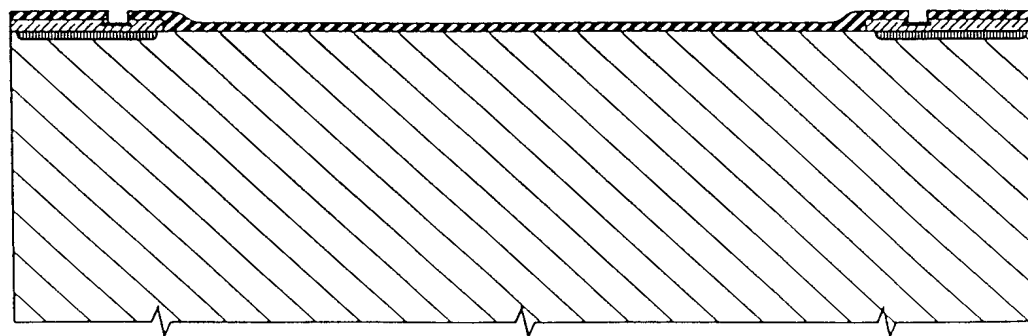
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*FIG. 630**FIG. 631*

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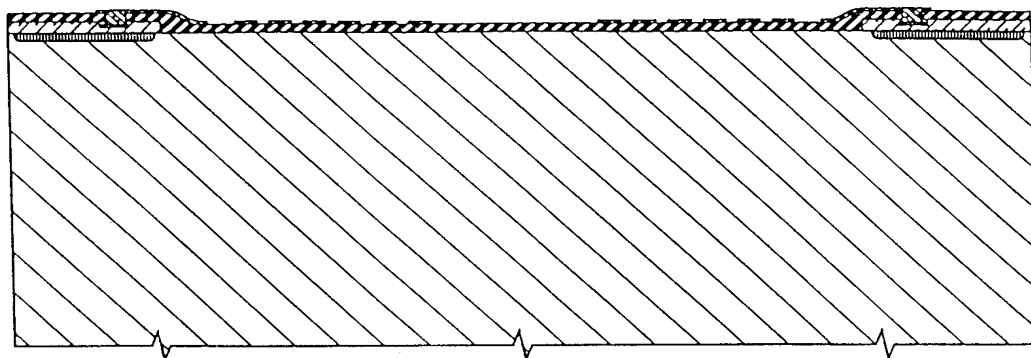


FIG. 632

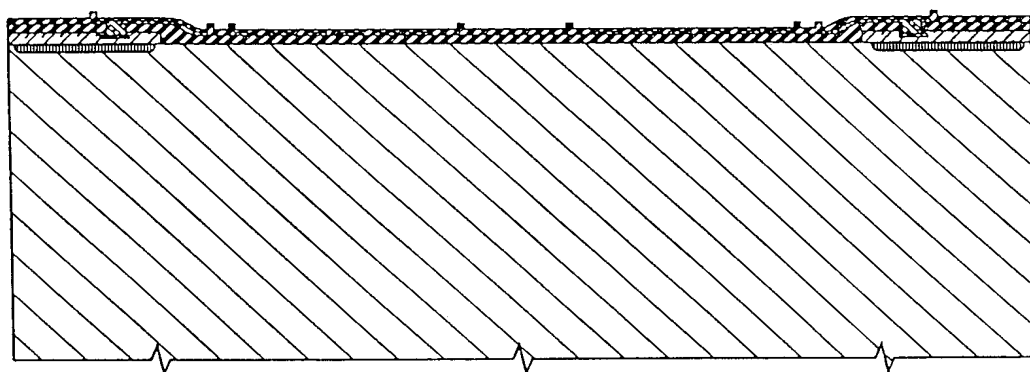


FIG. 633

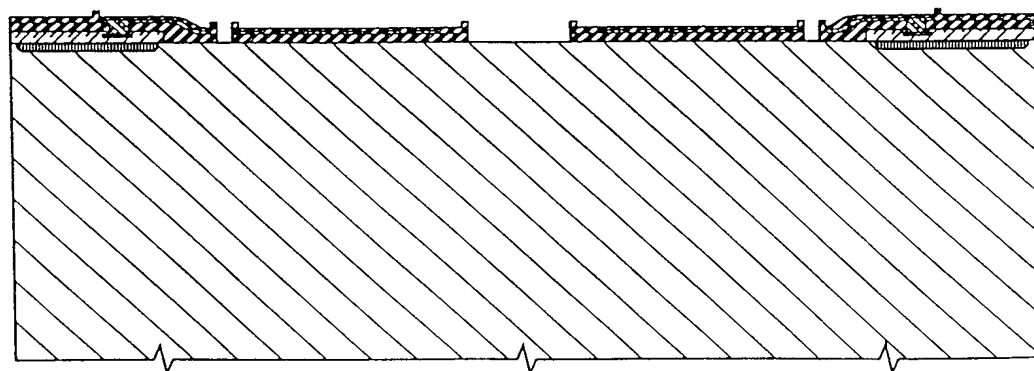


FIG. 634

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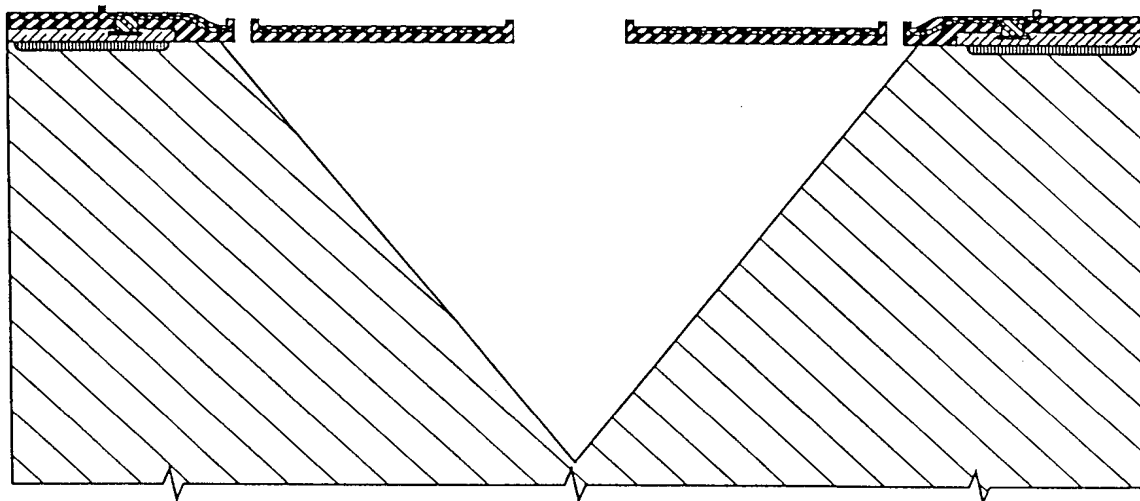


FIG. 635

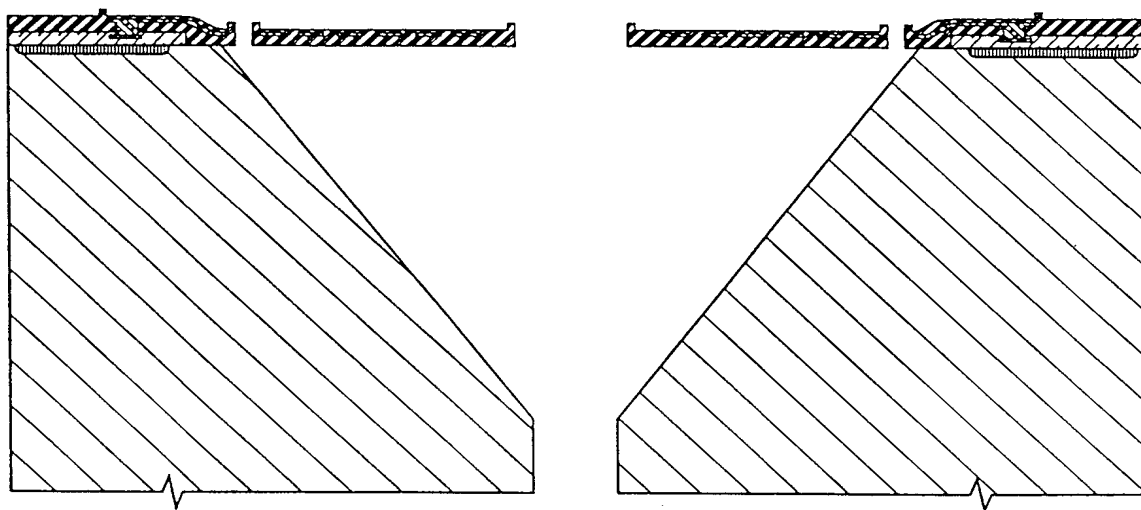


FIG. 636

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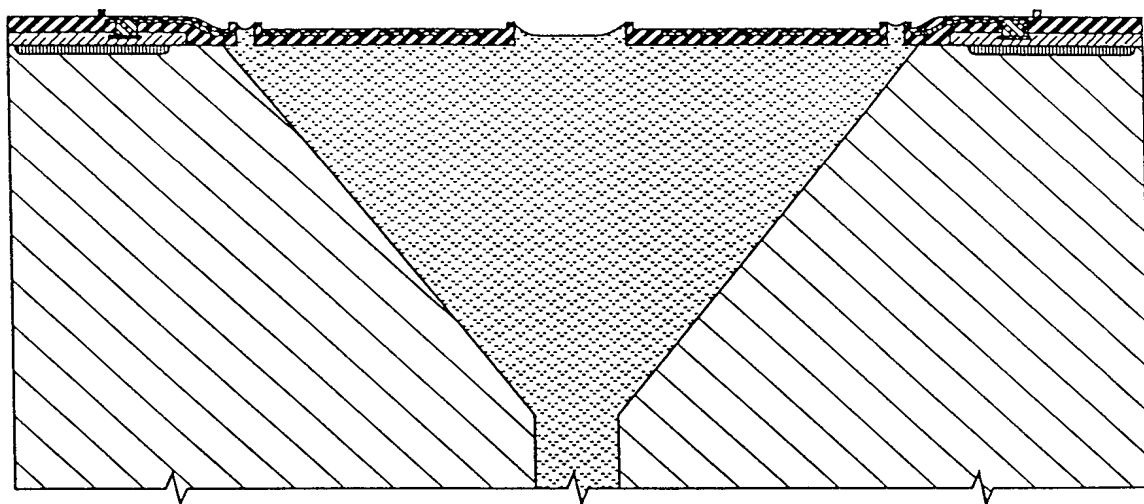
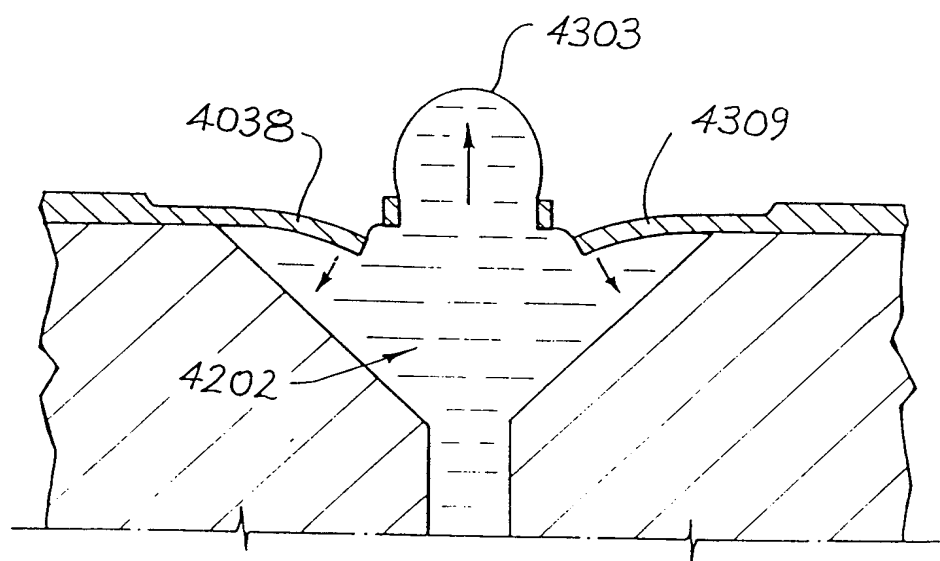
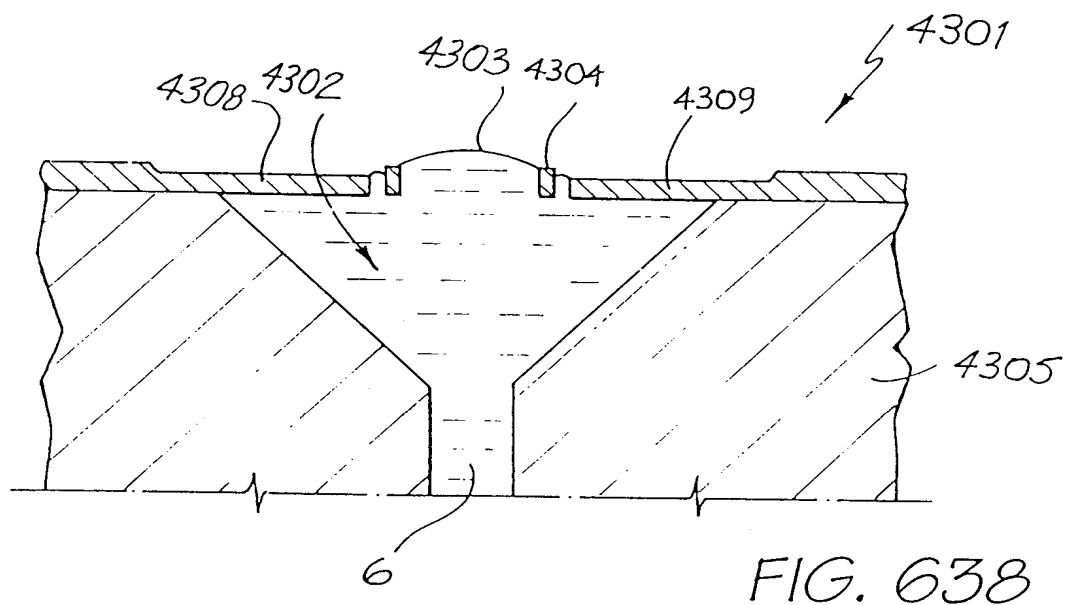


FIG. 637

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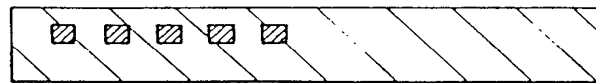
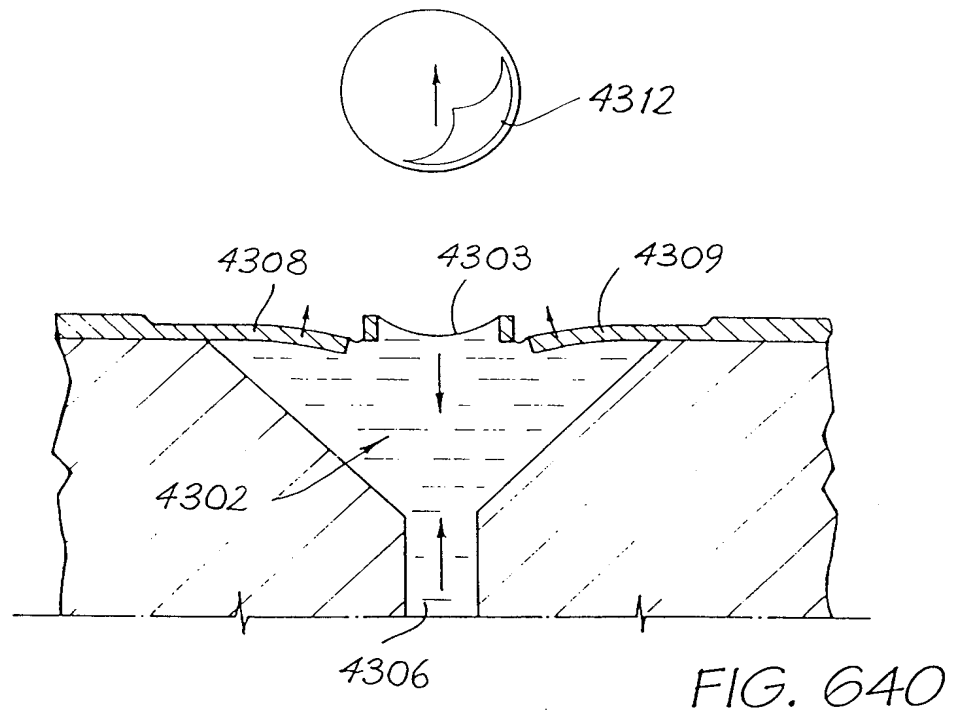


FIG. 641a

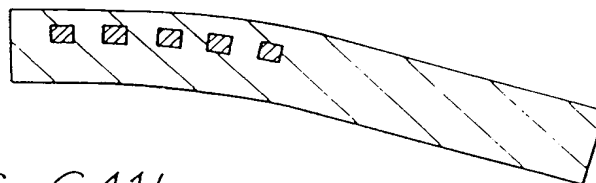


FIG. 641b

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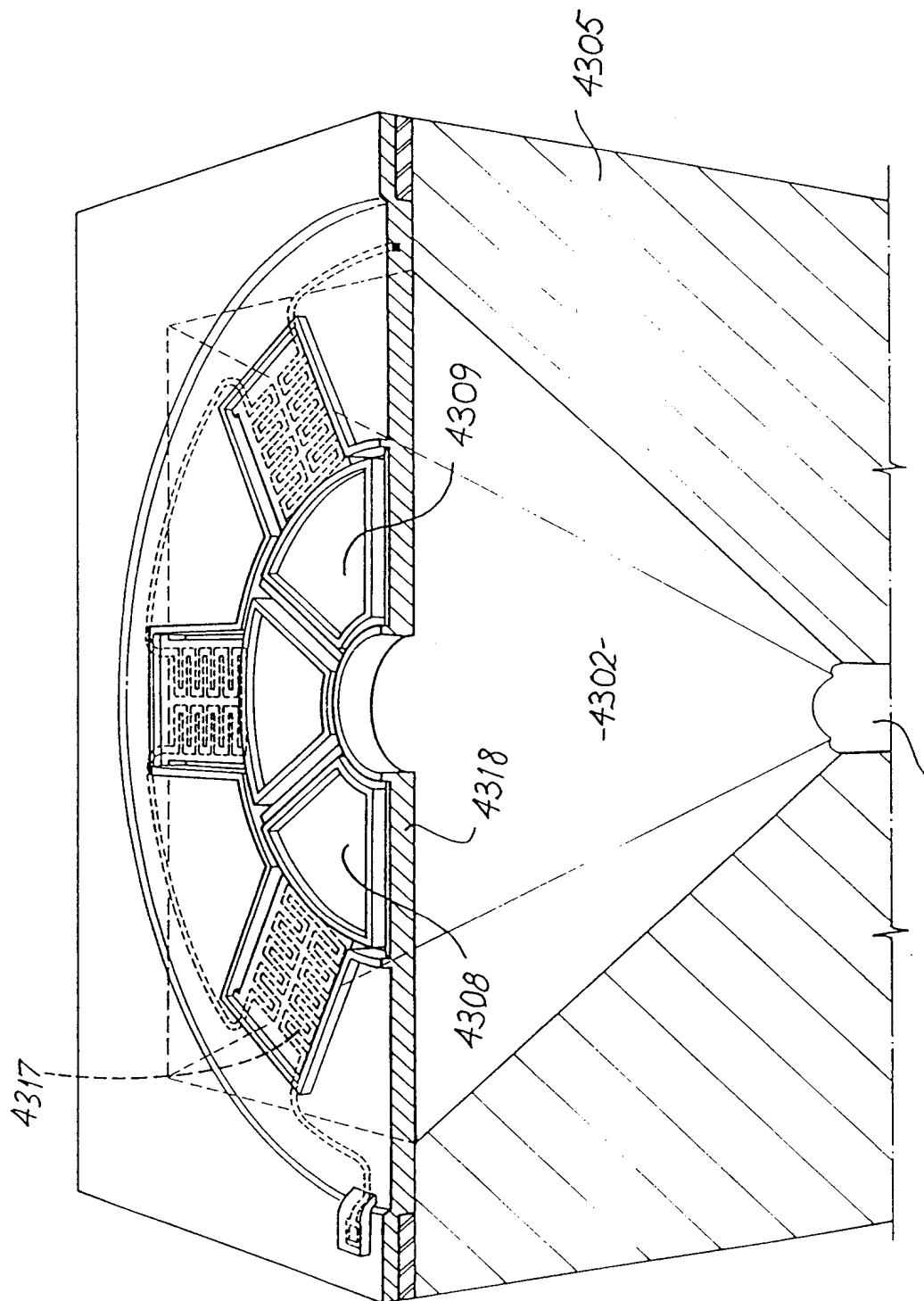
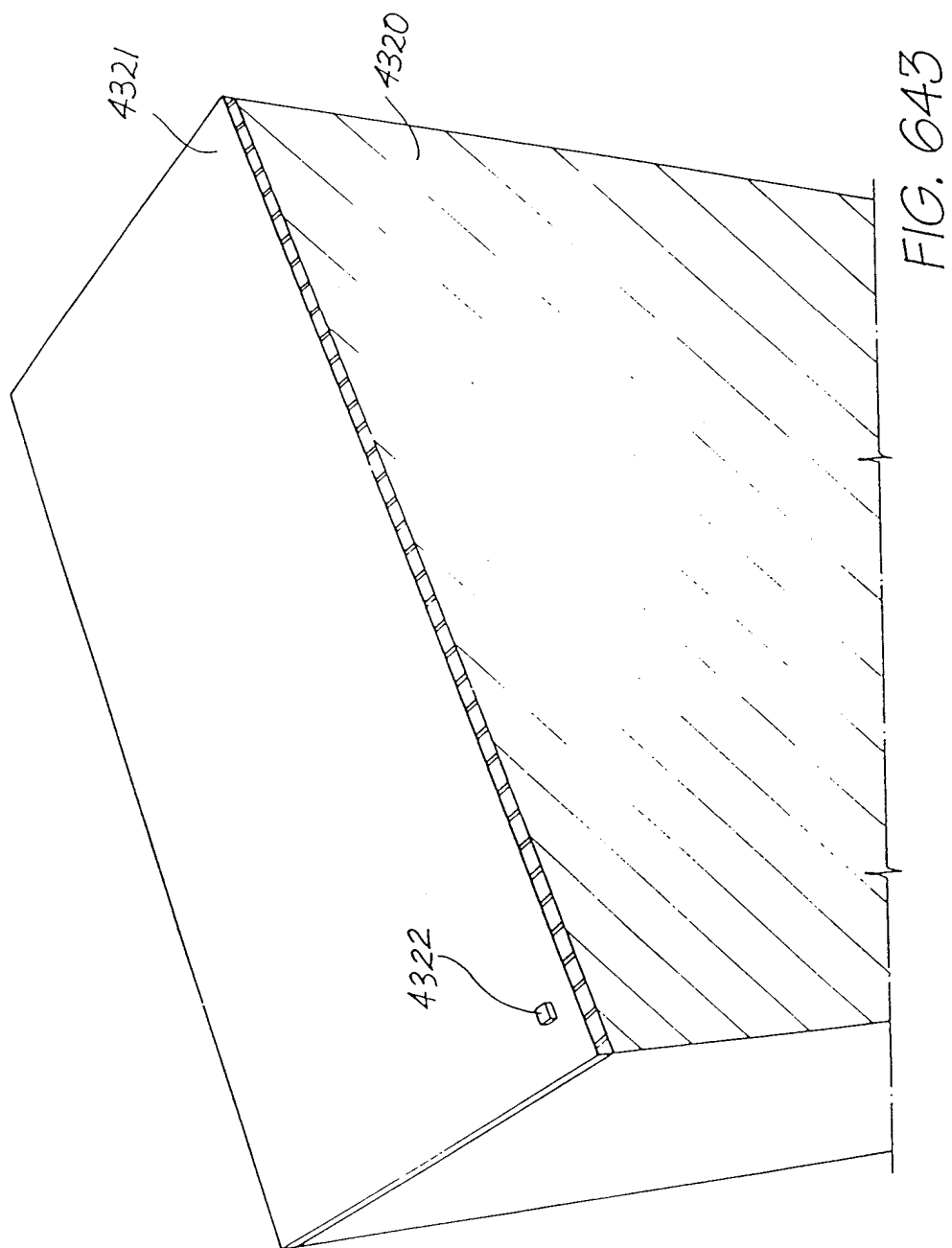
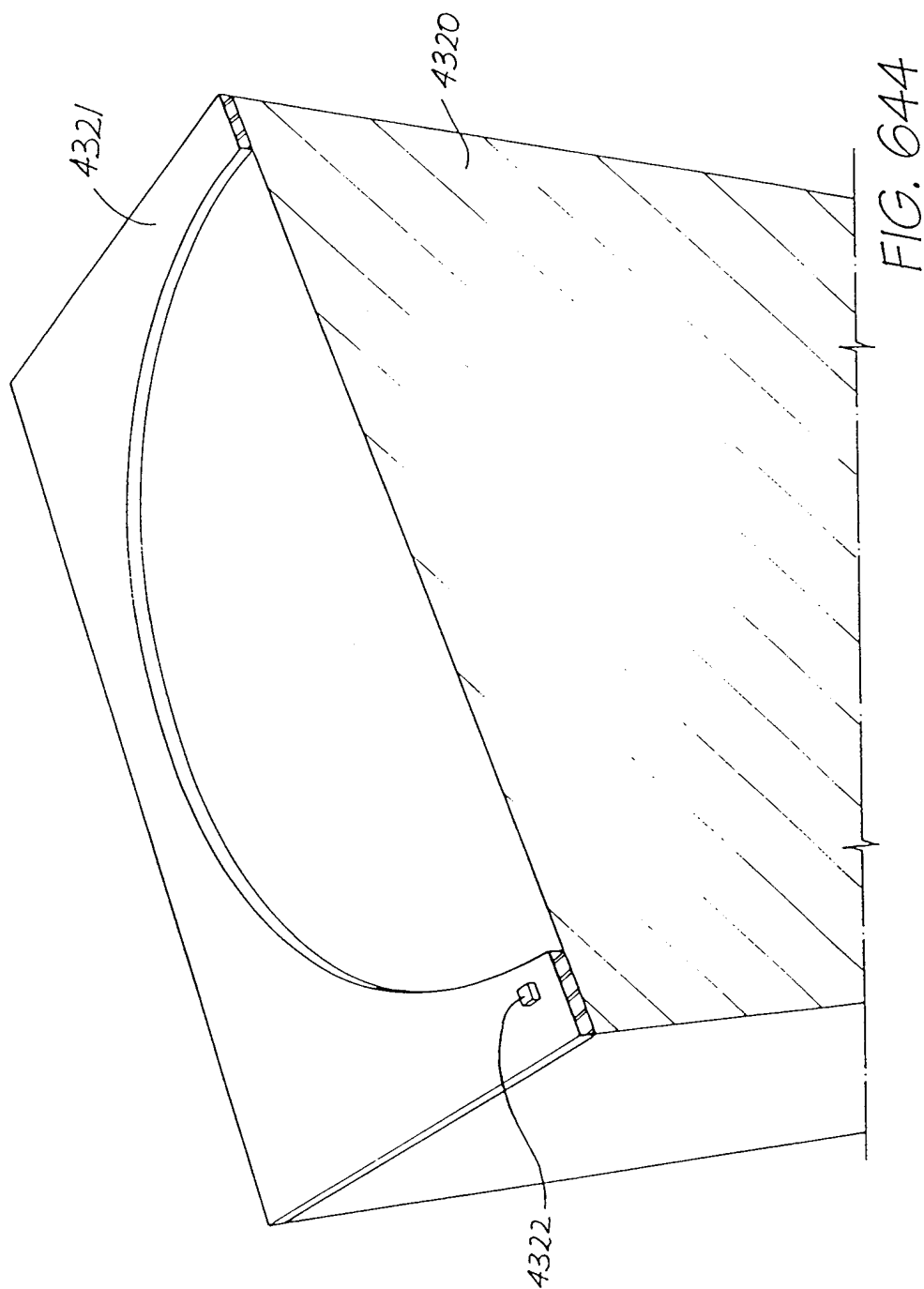


FIG. 642

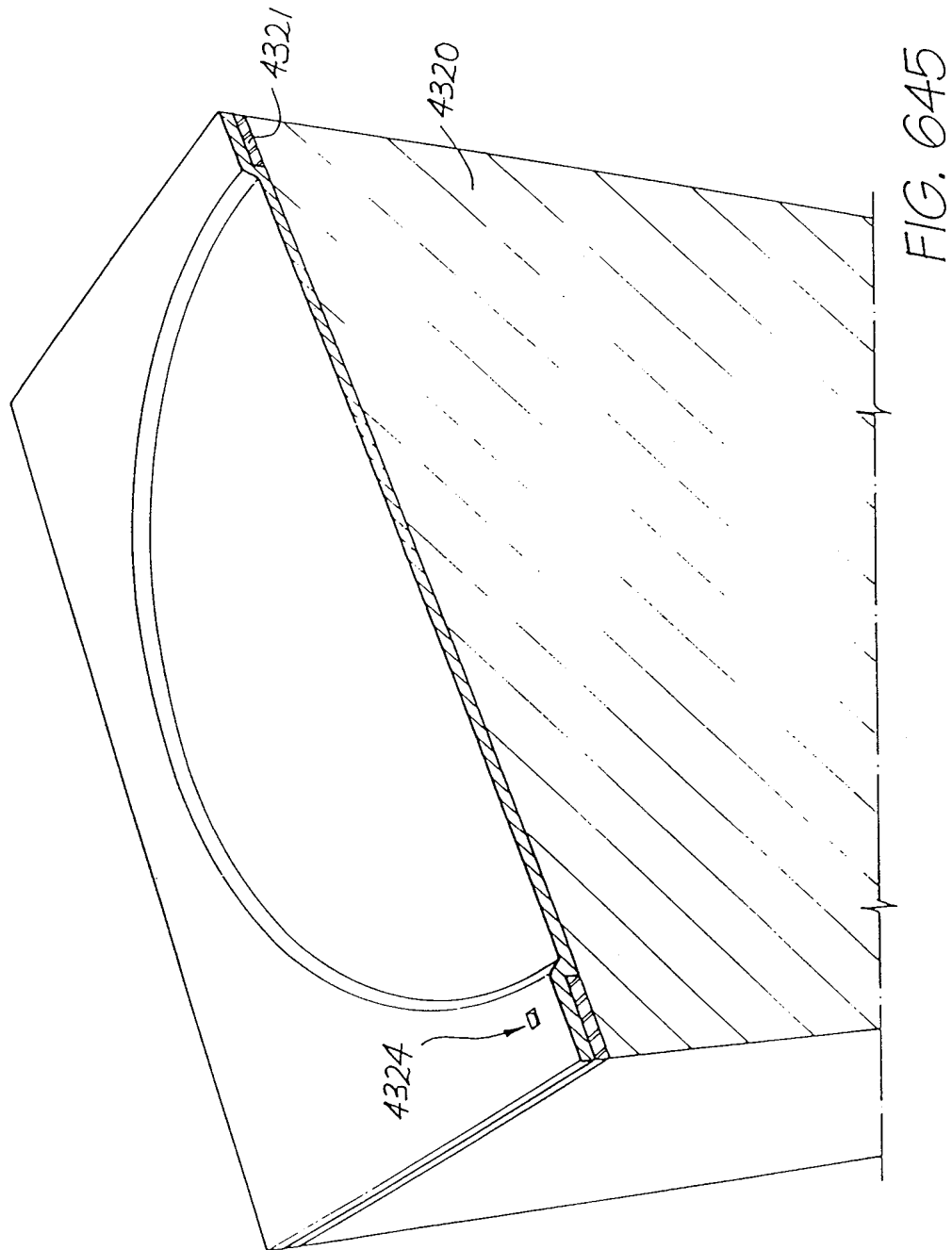
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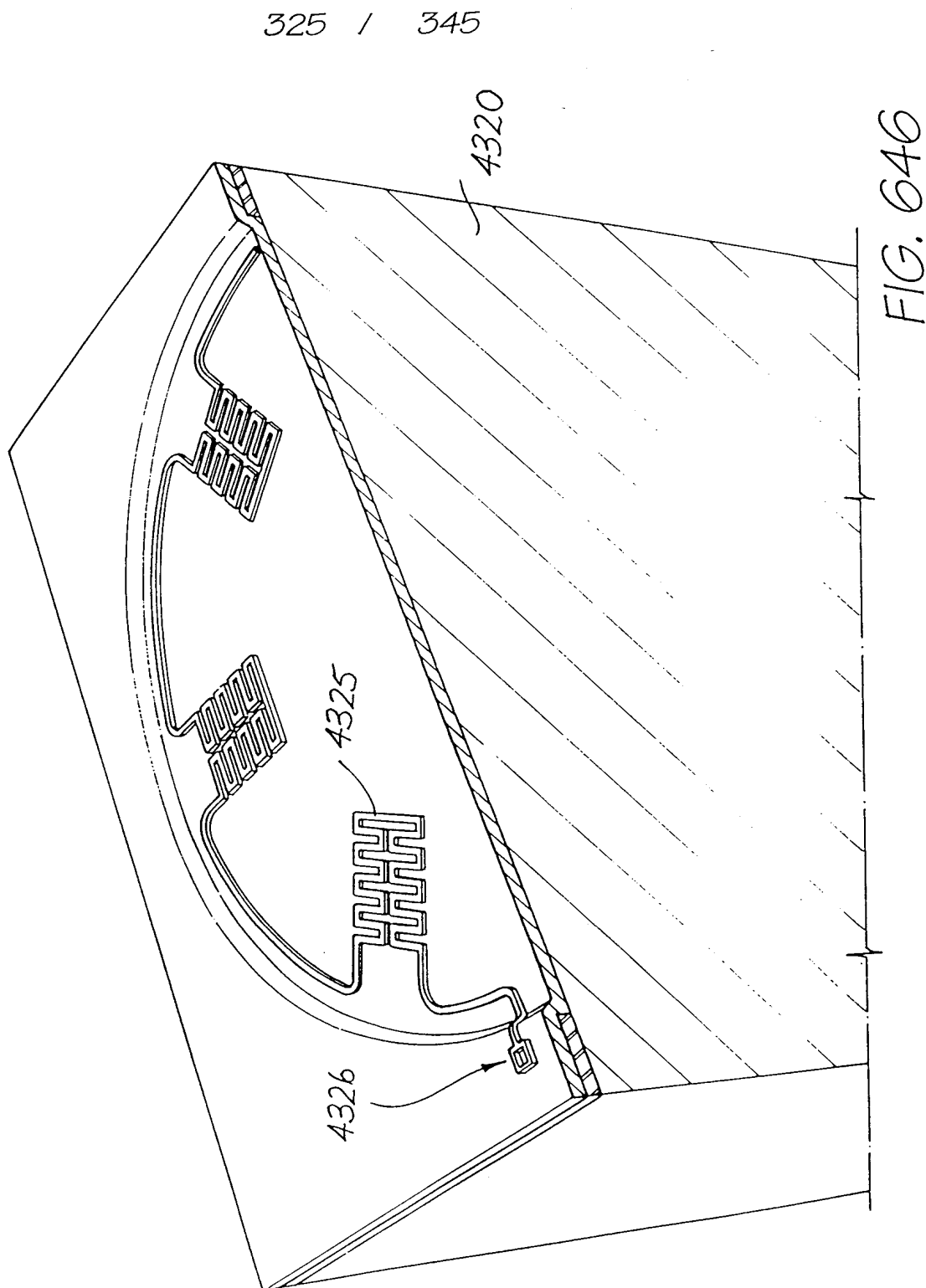


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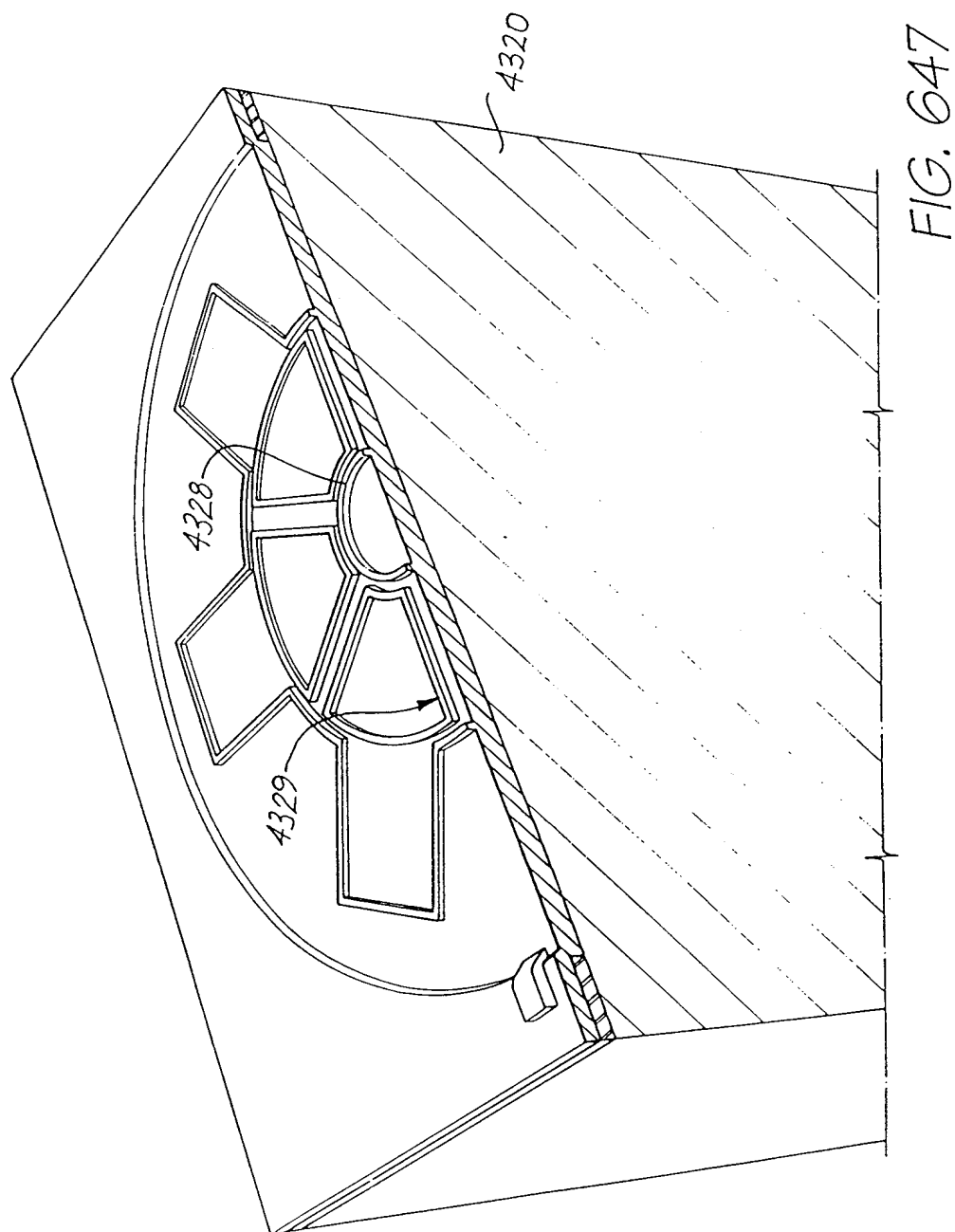


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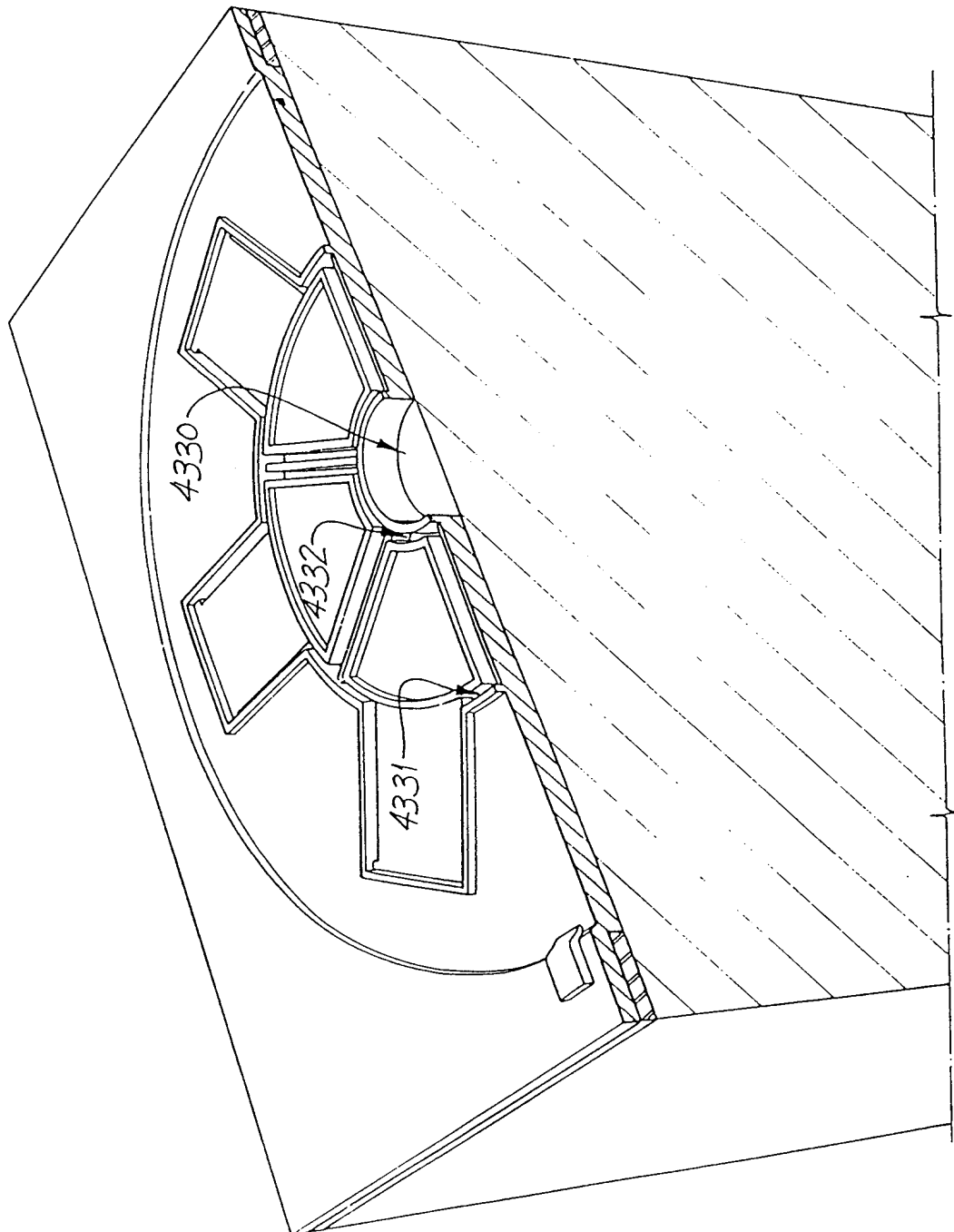


FIG. 648

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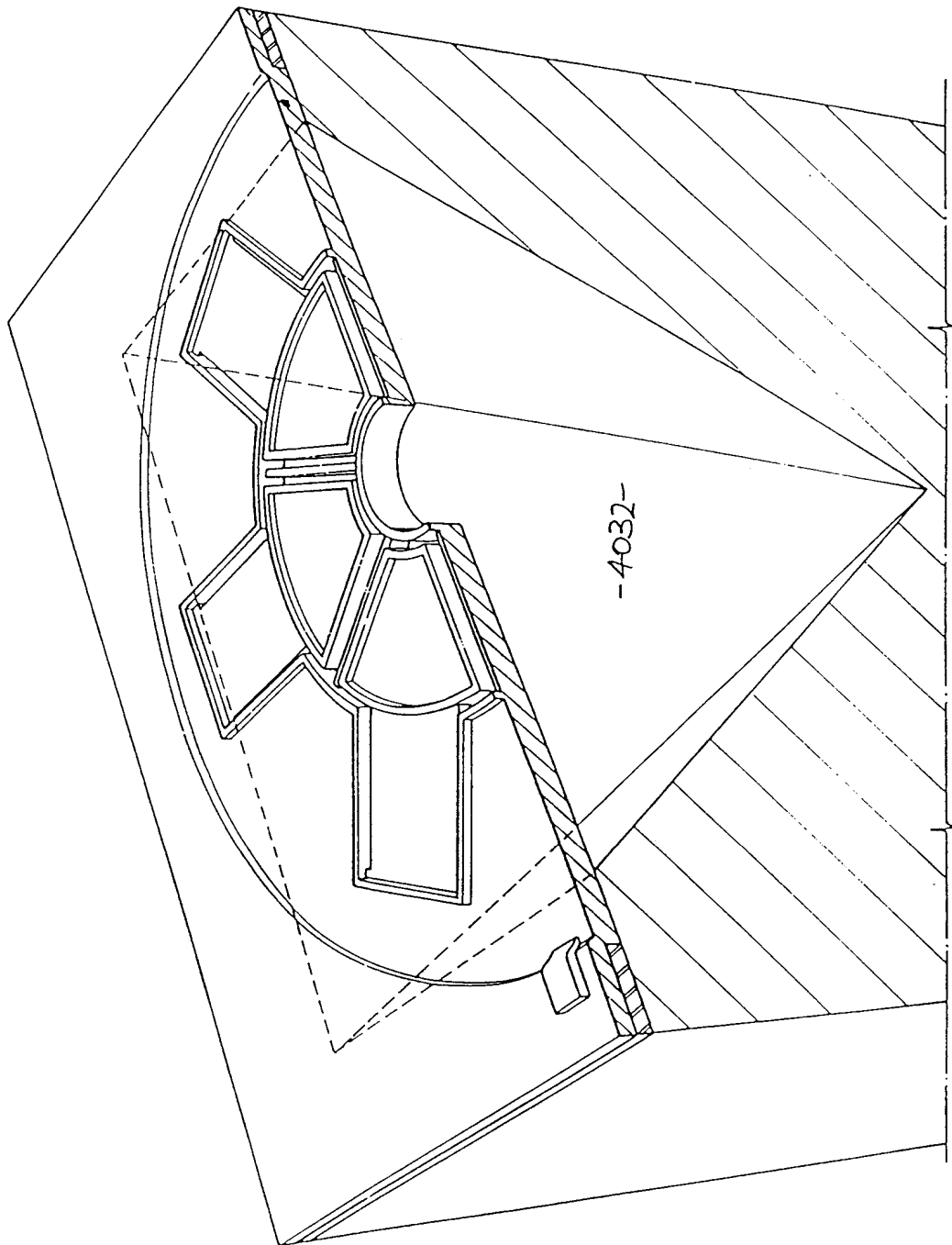
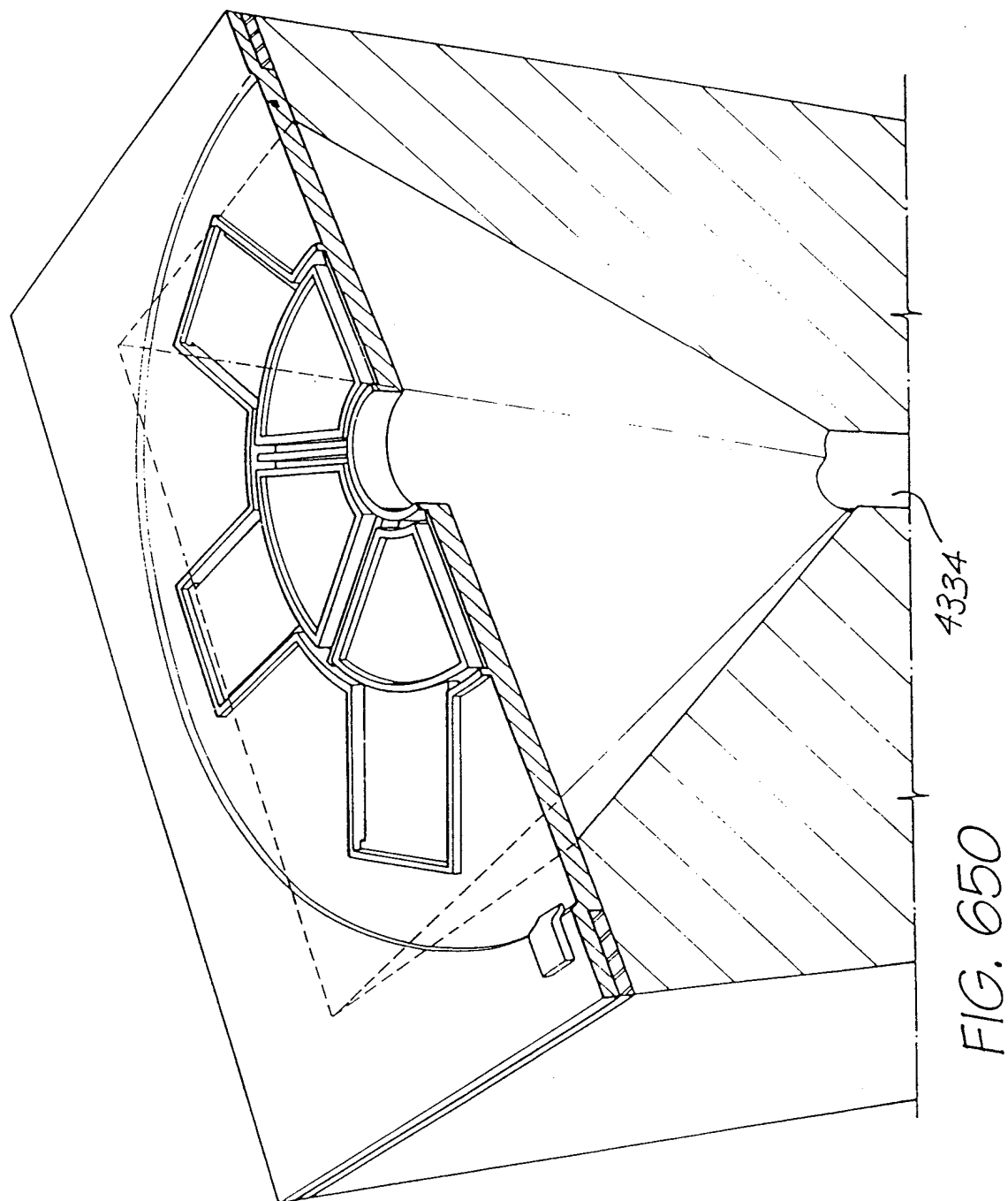
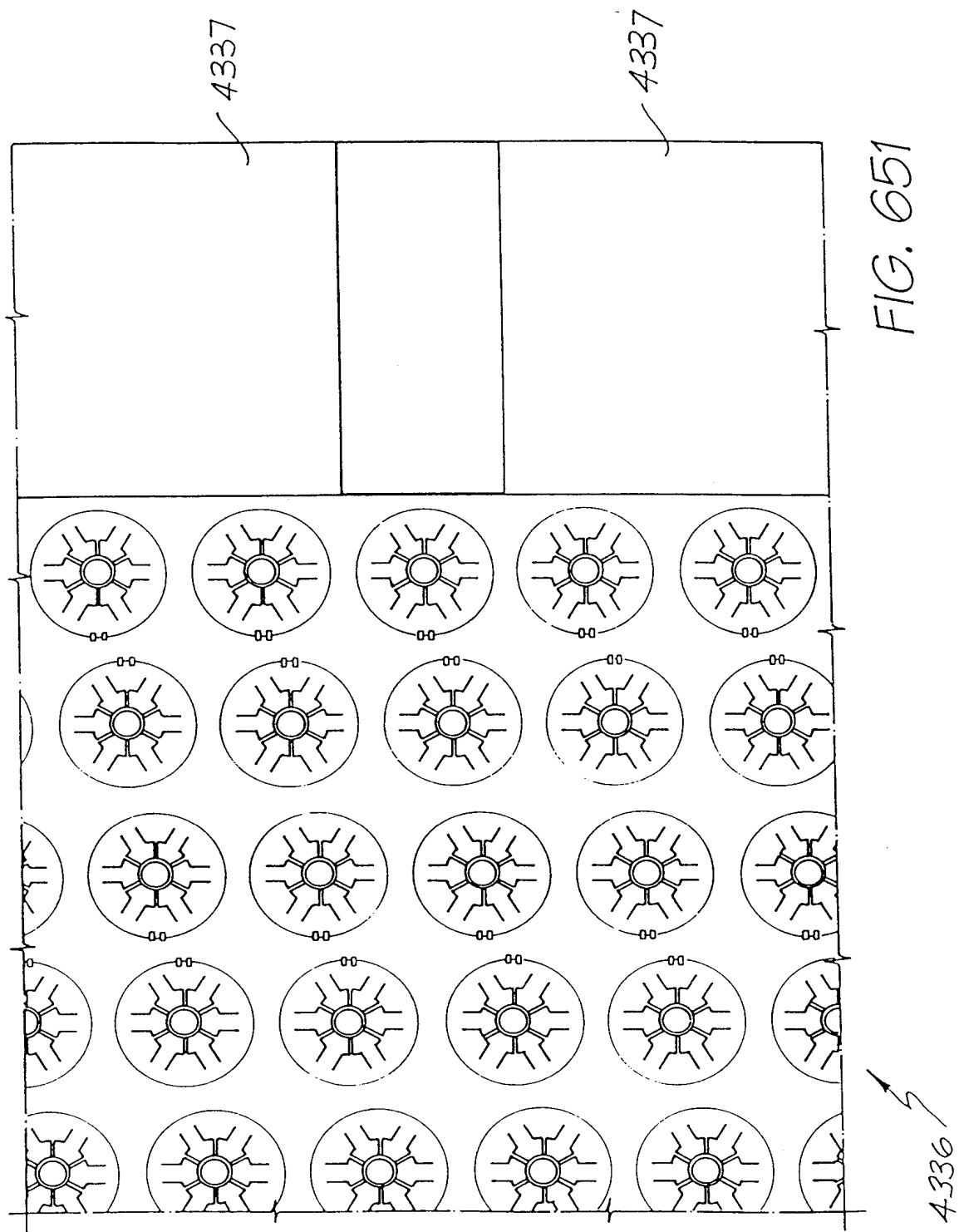


FIG. 649

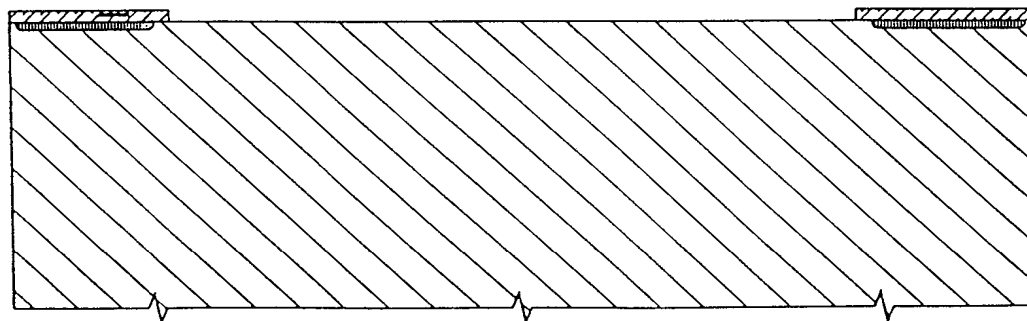
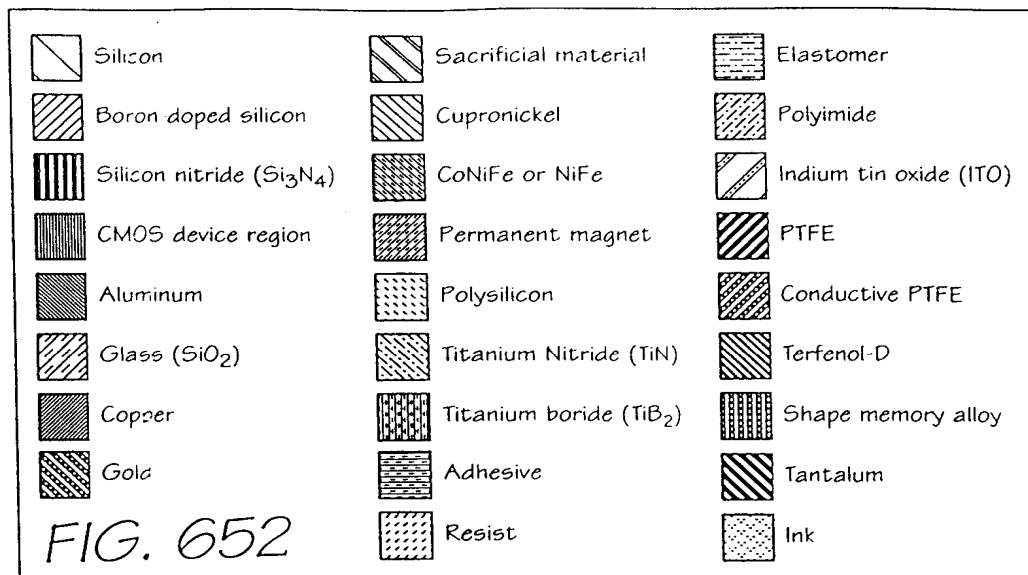
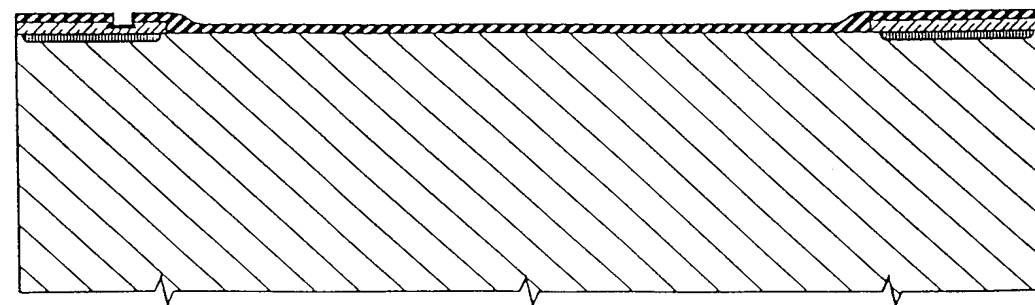
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*FIG. 653**FIG. 654*

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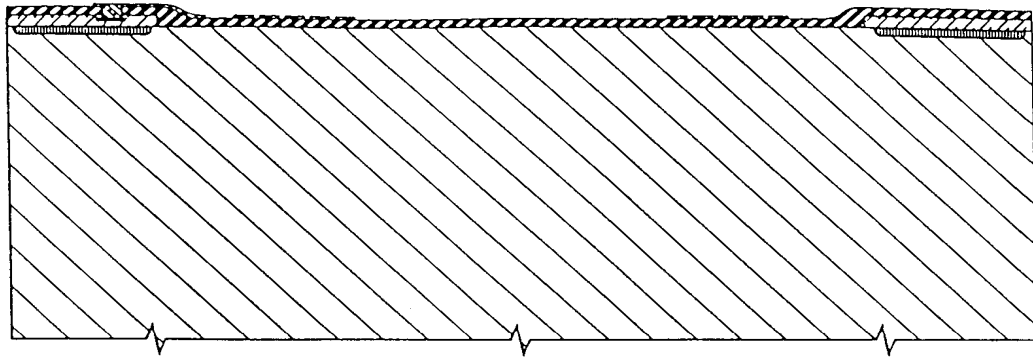


FIG. 655

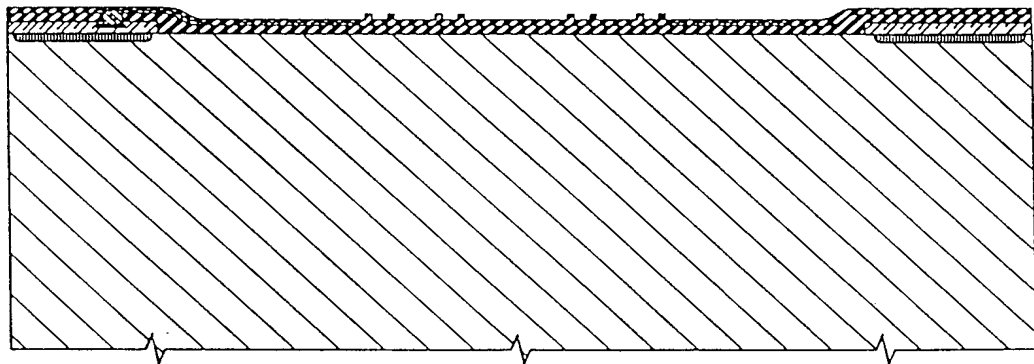


FIG. 656



FIG. 657

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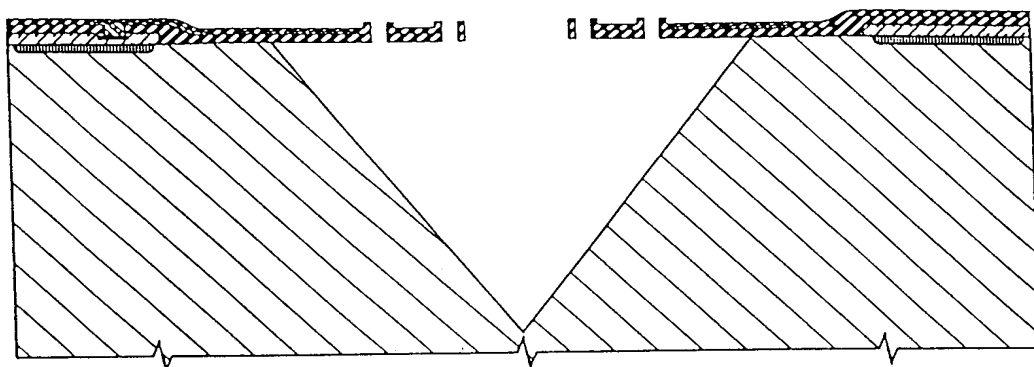


FIG. 658

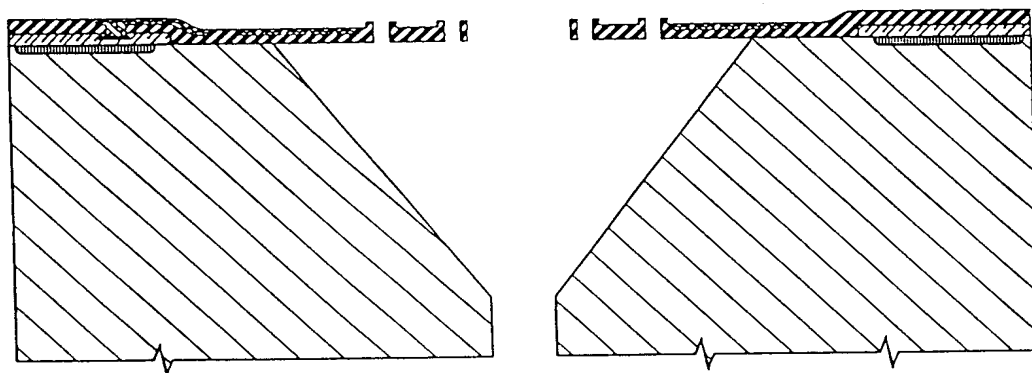


FIG. 659

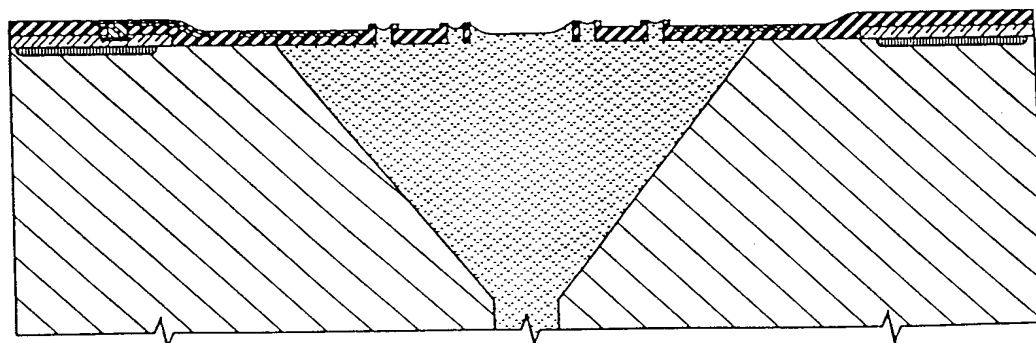
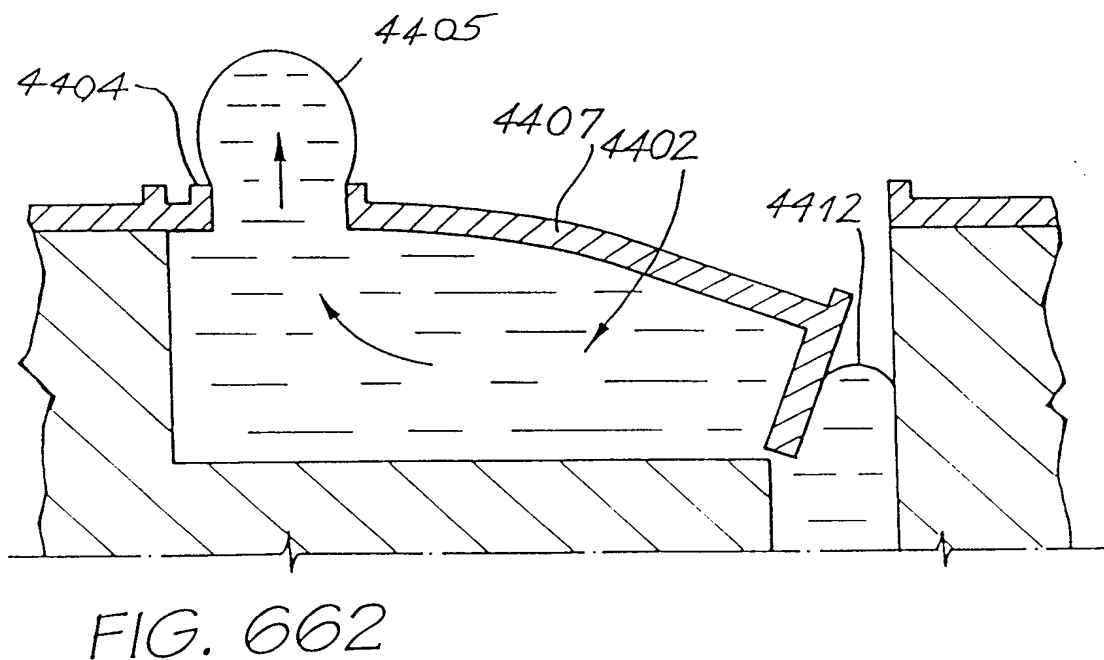
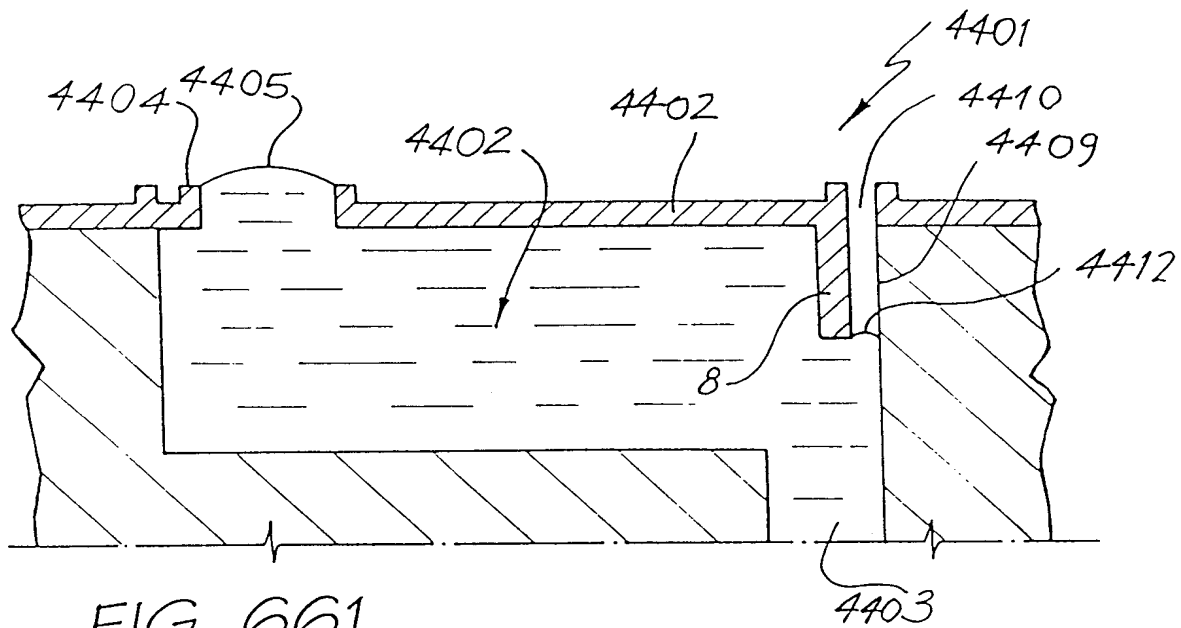
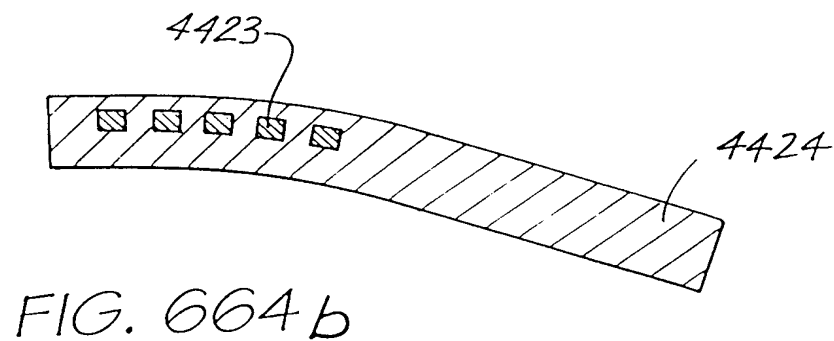
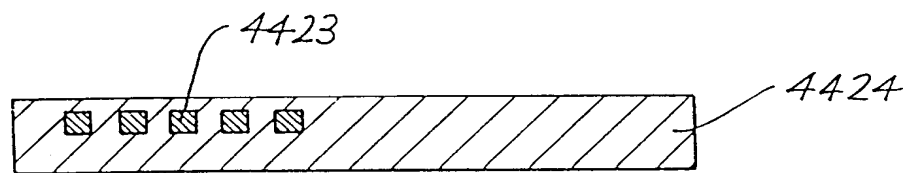
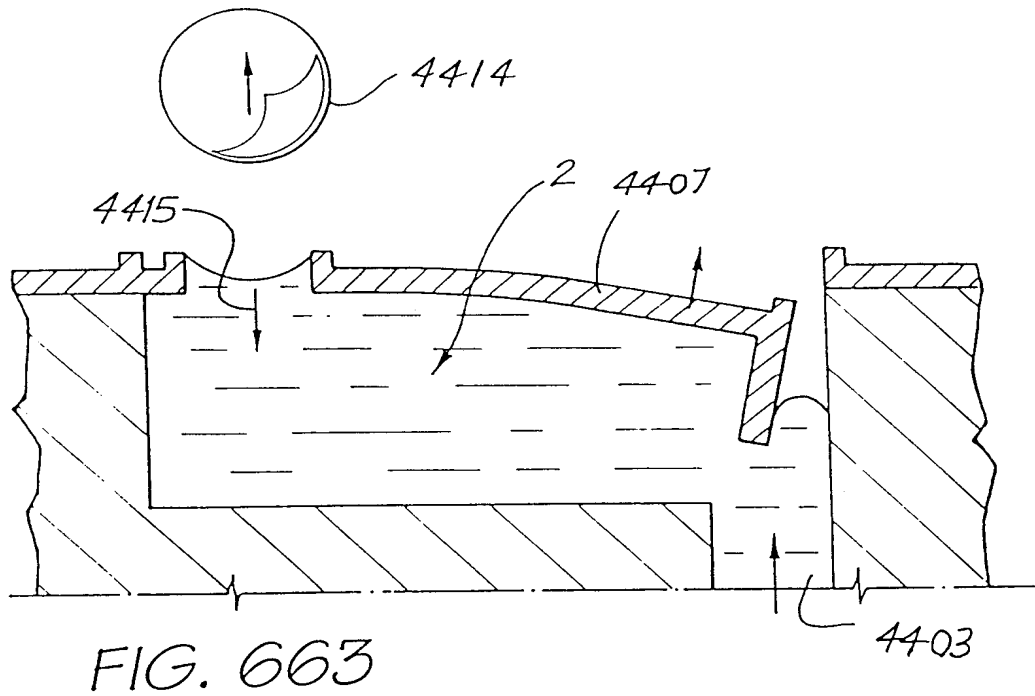


FIG. 660

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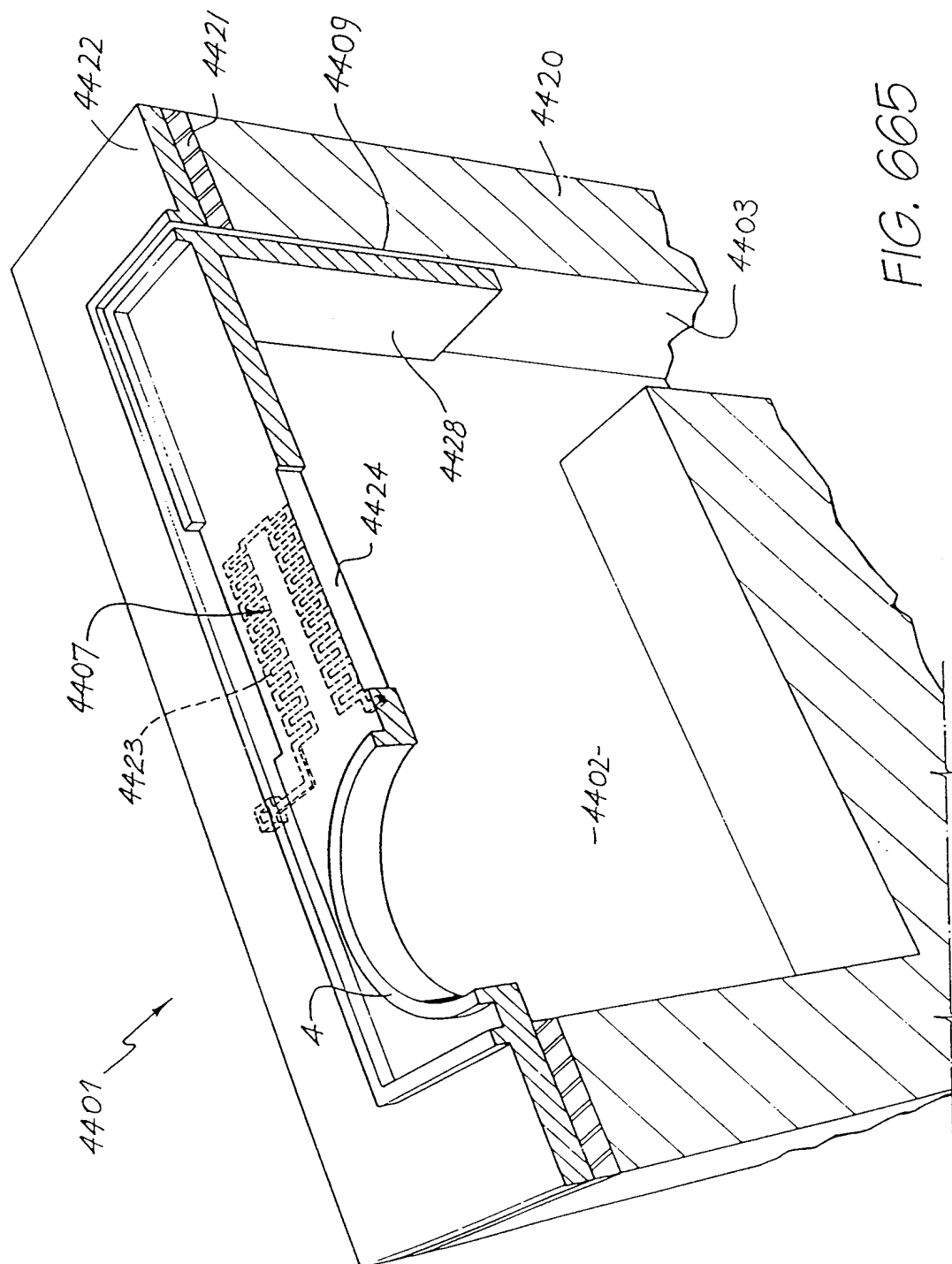


FIG. 665

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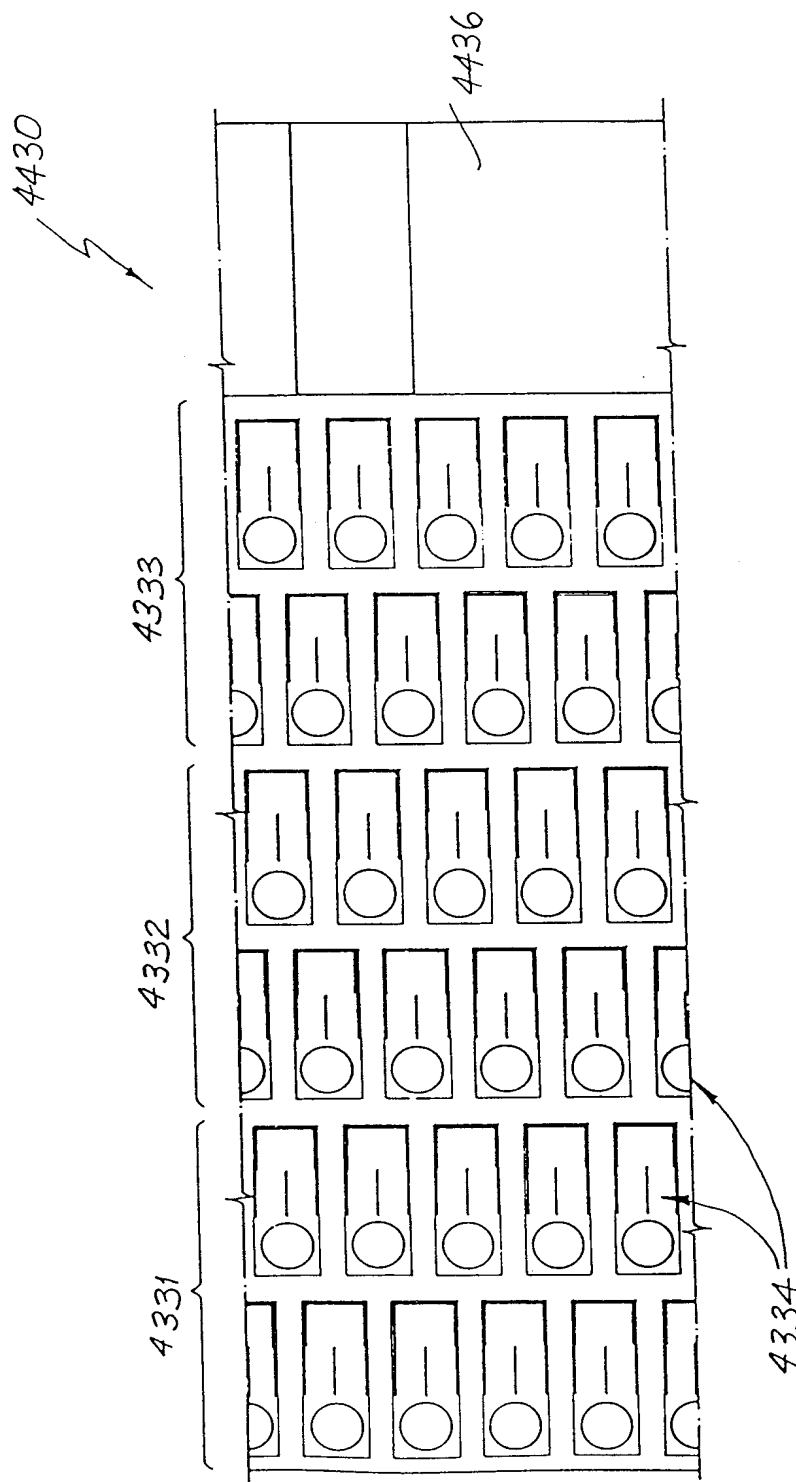
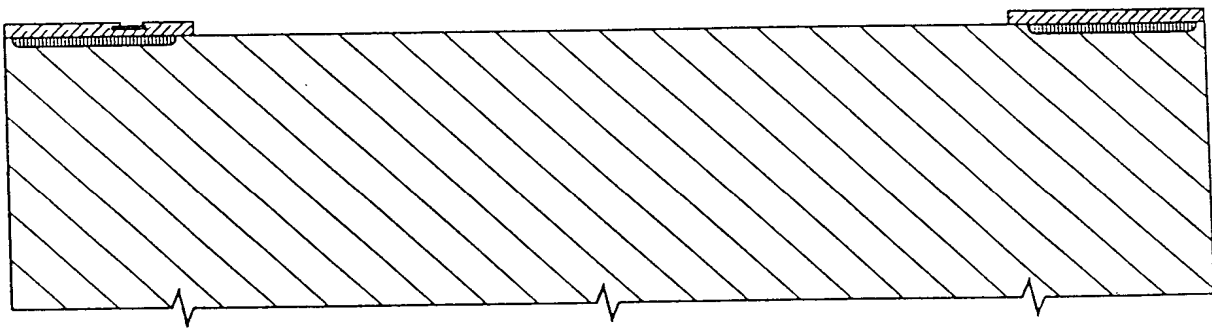
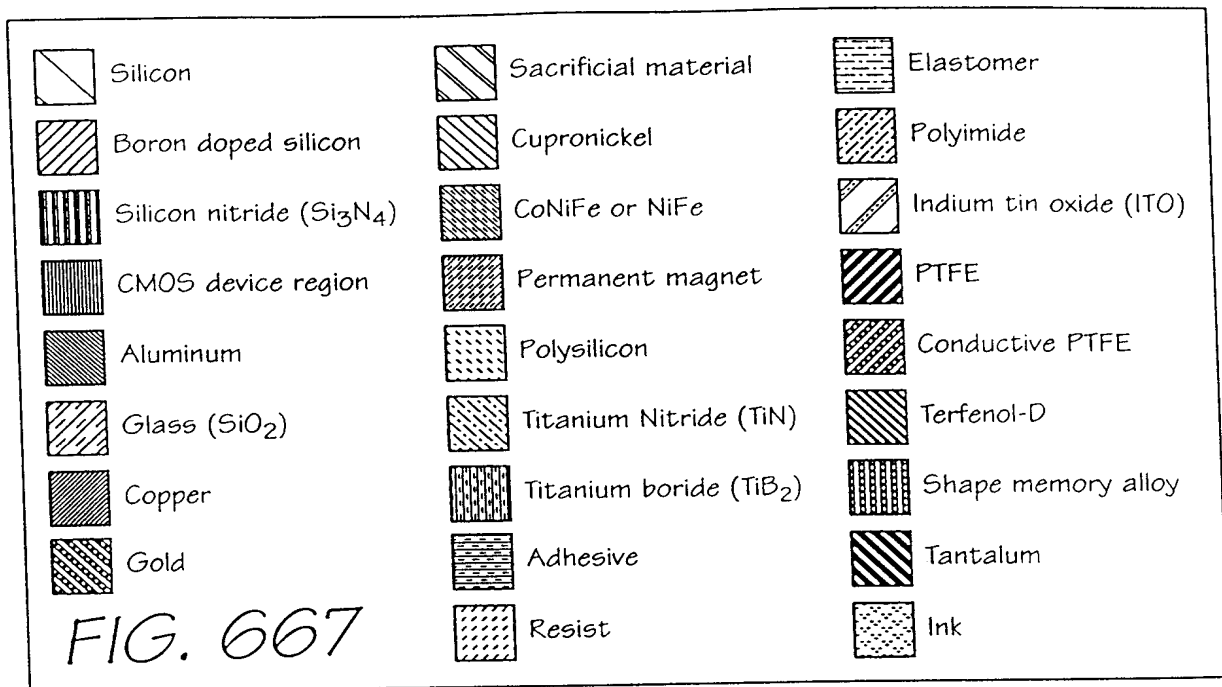
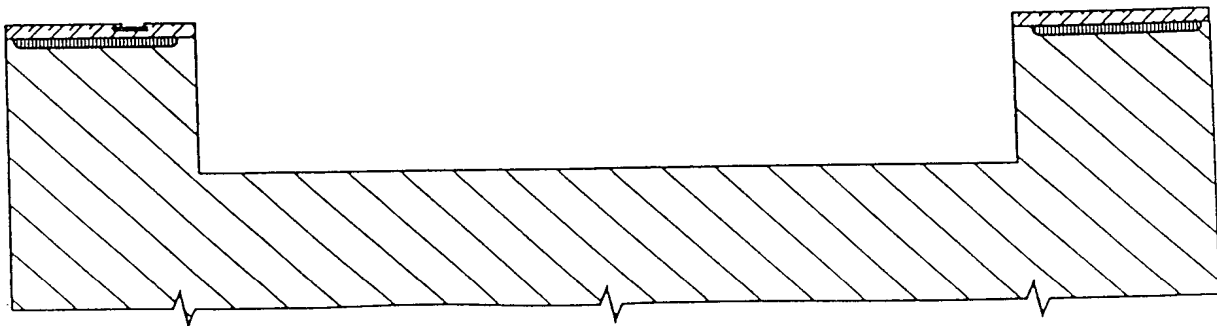


FIG. 666

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*FIG. 668**FIG. 669*

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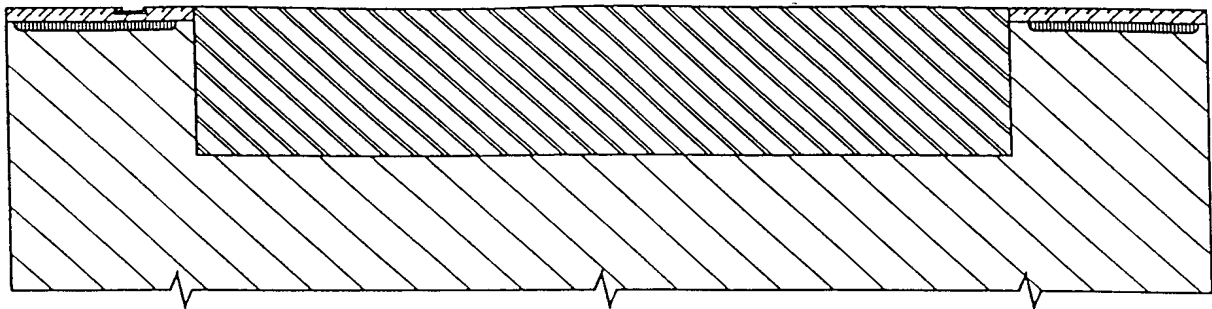


FIG. 670

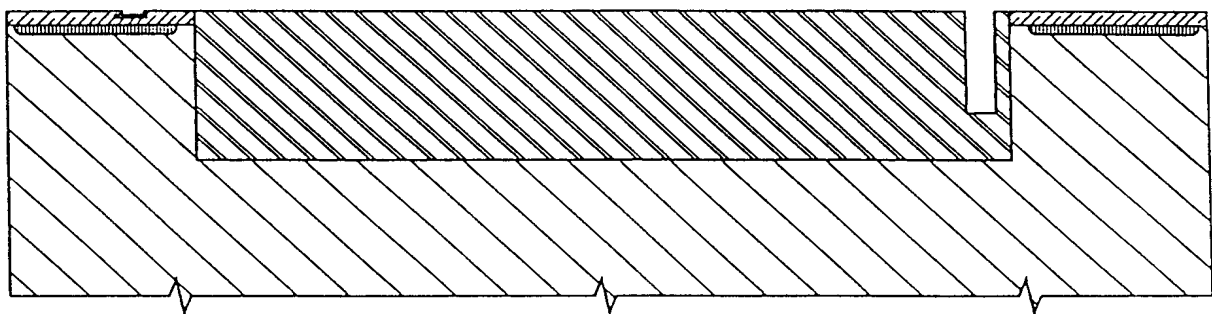


FIG. 671

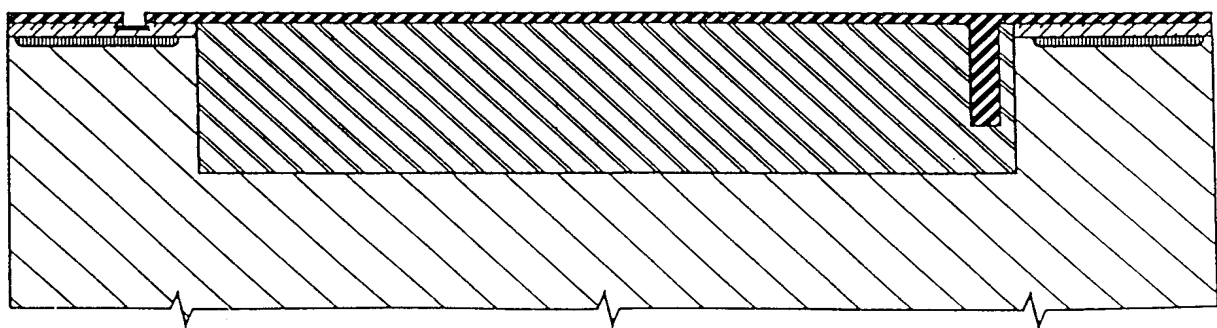


FIG. 672

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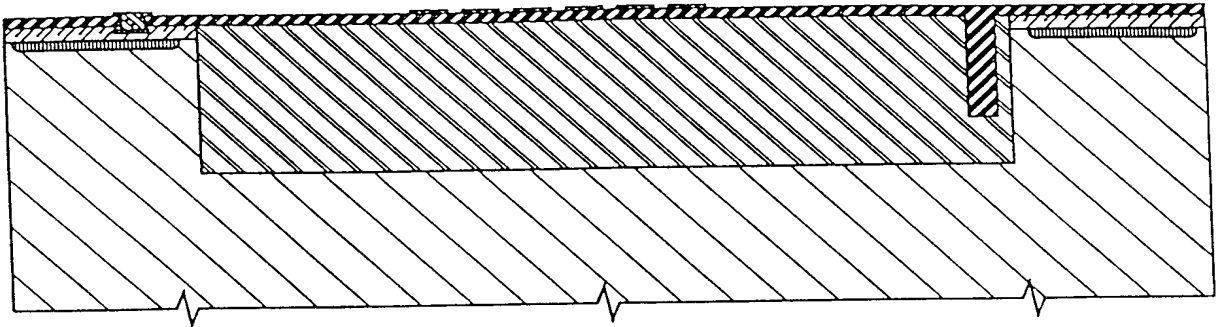


FIG. 673

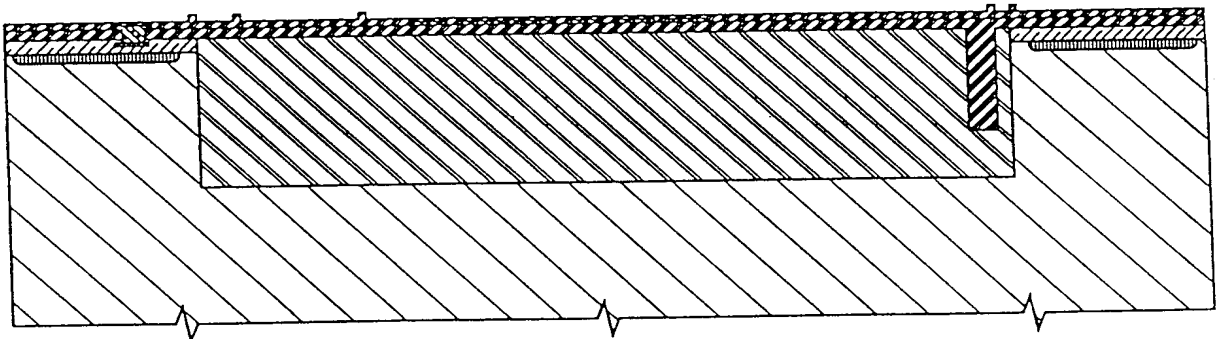


FIG. 674

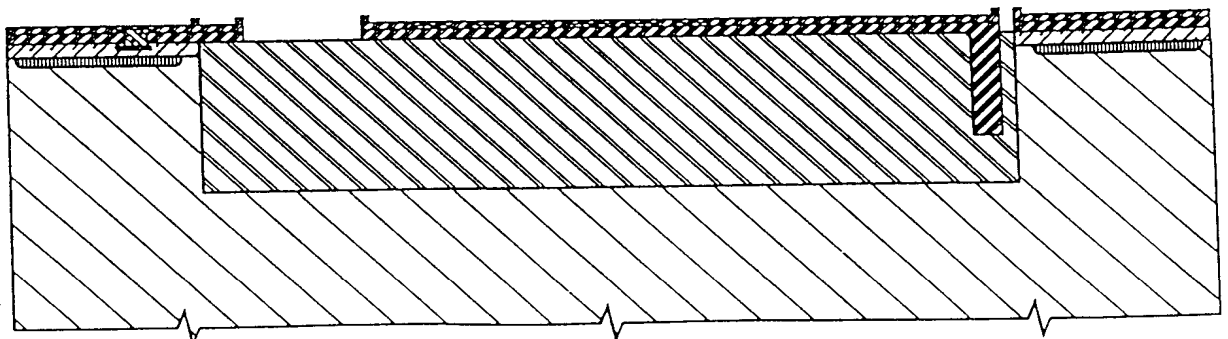


FIG. 675

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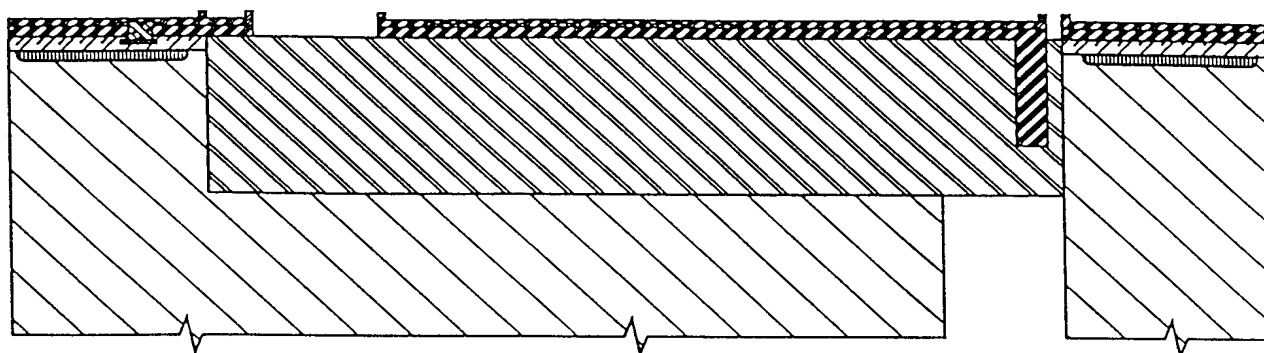


FIG. 676

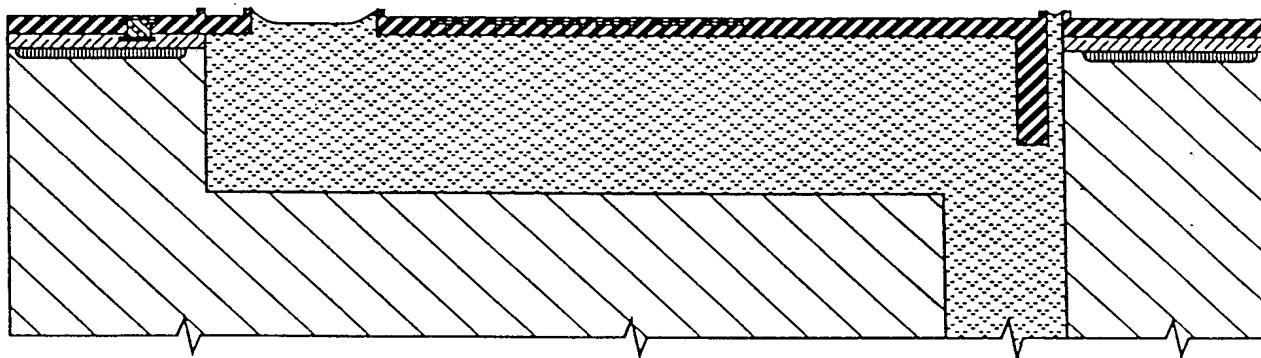


FIG. 677

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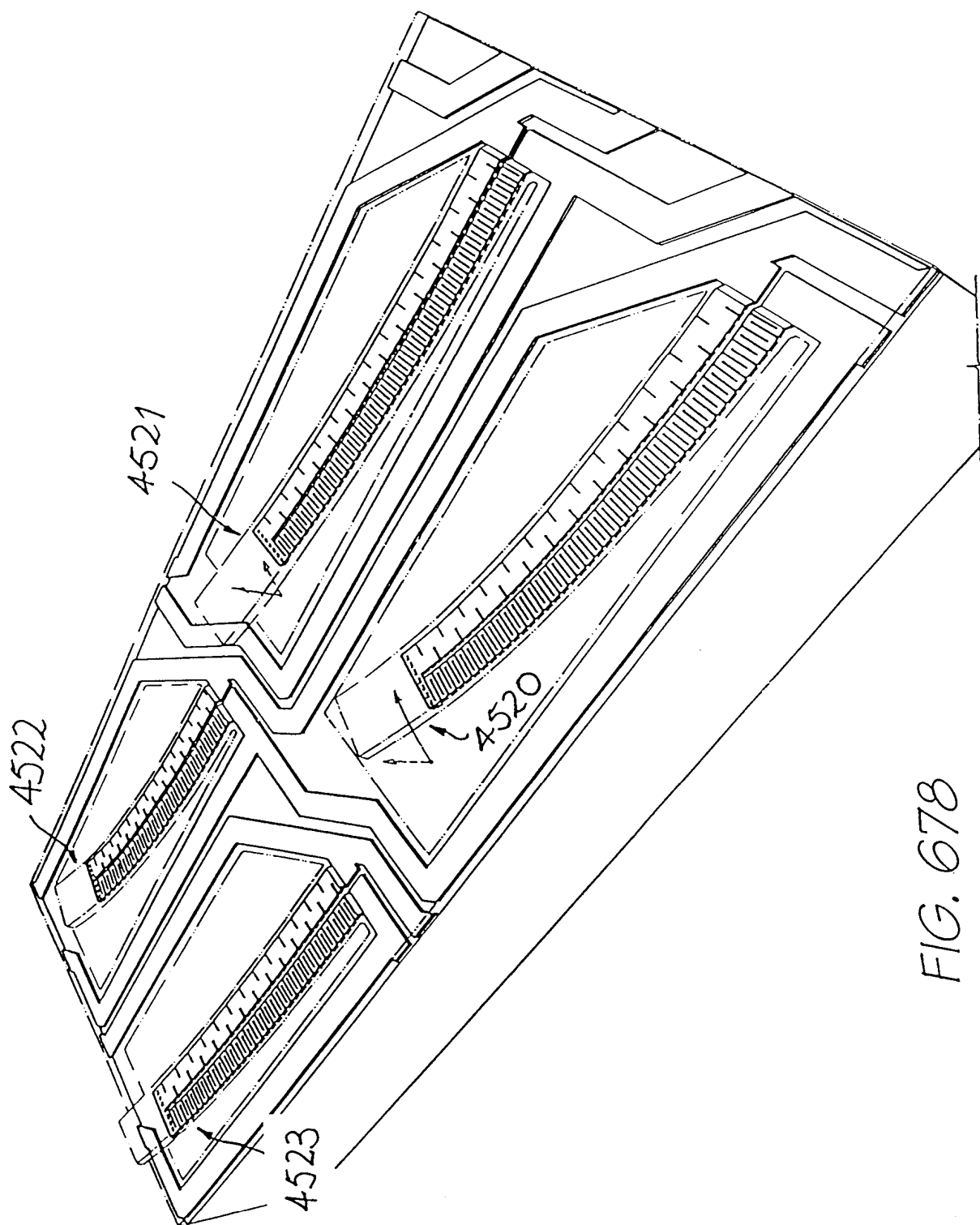


FIG. 678

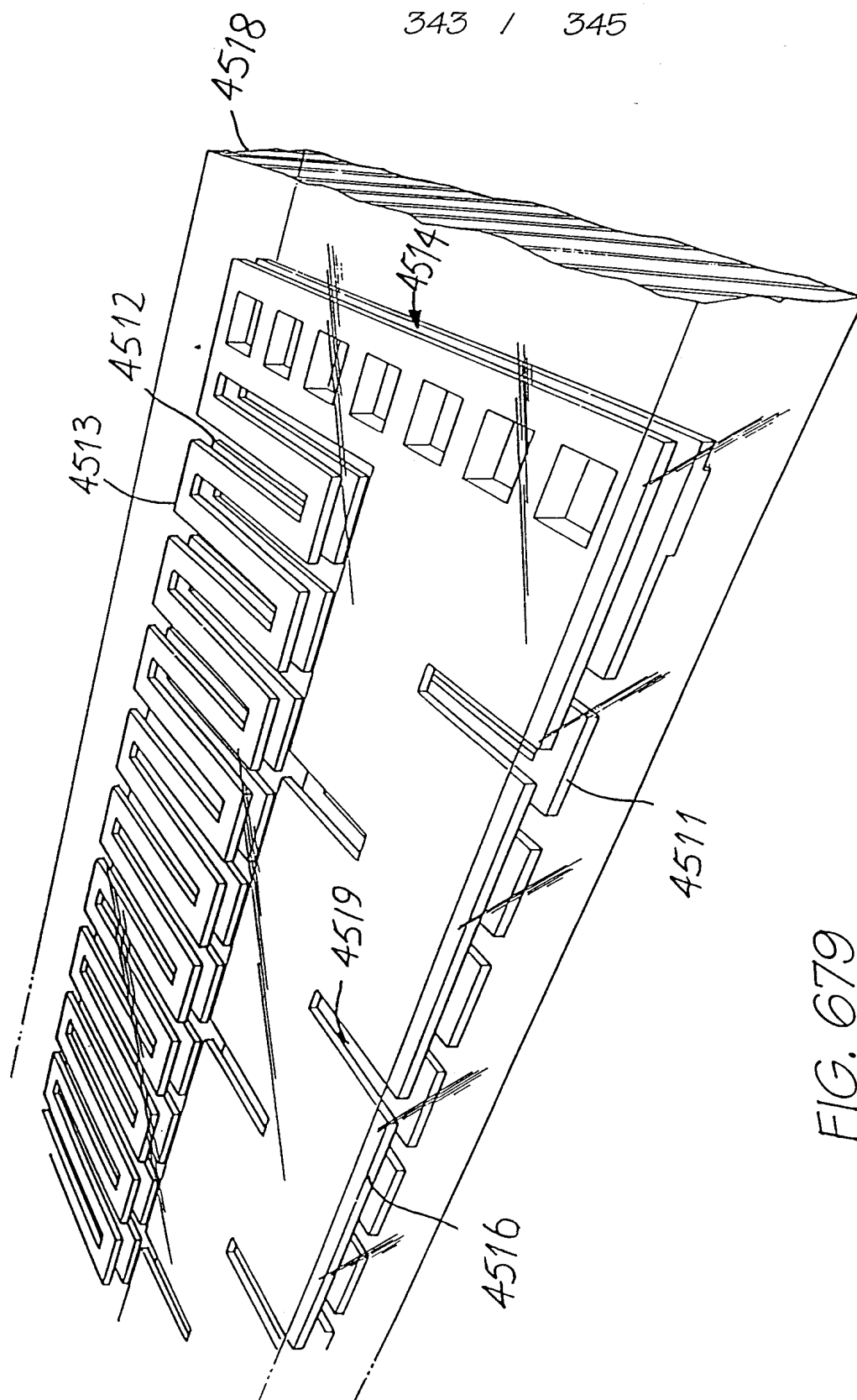
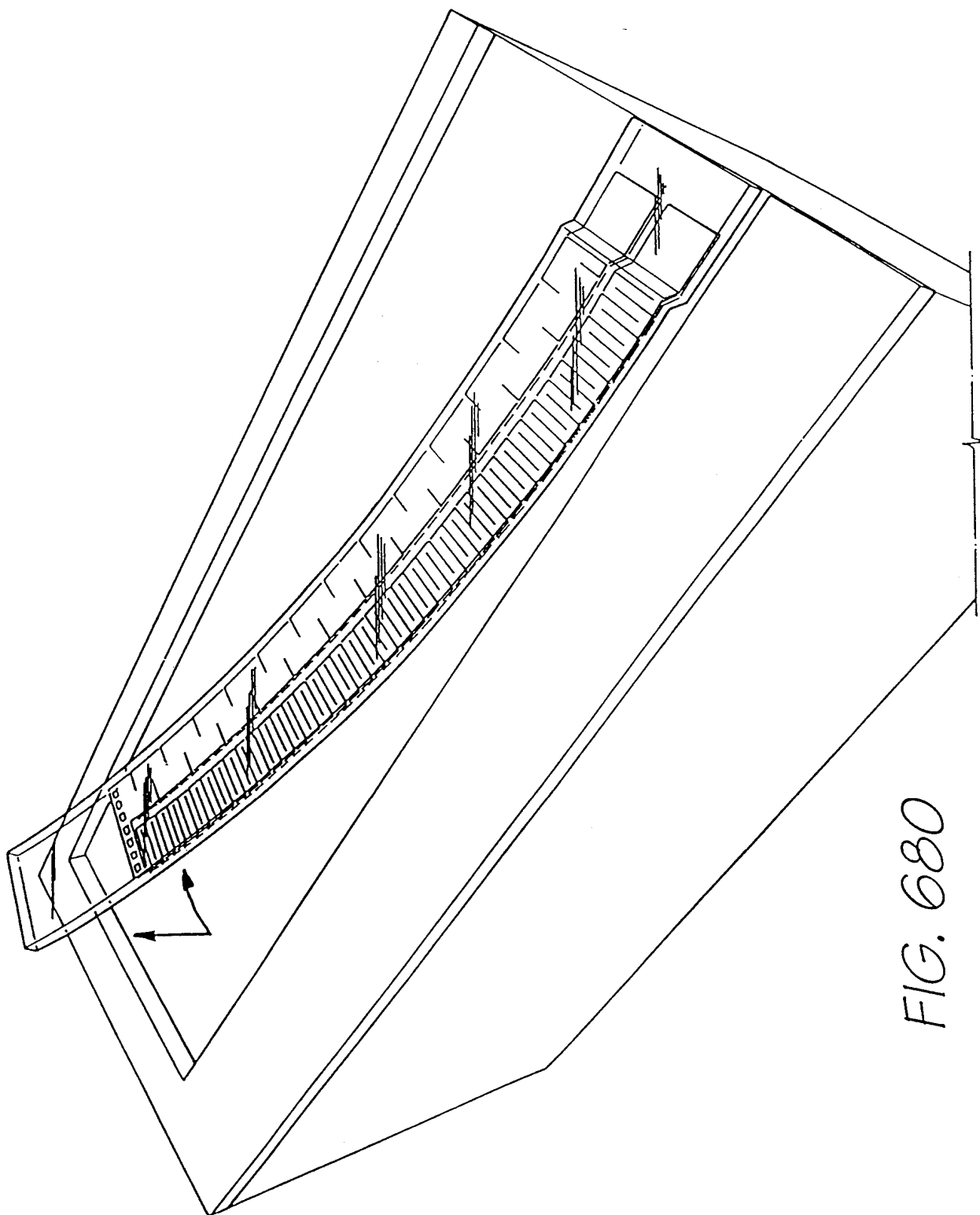


FIG. 679

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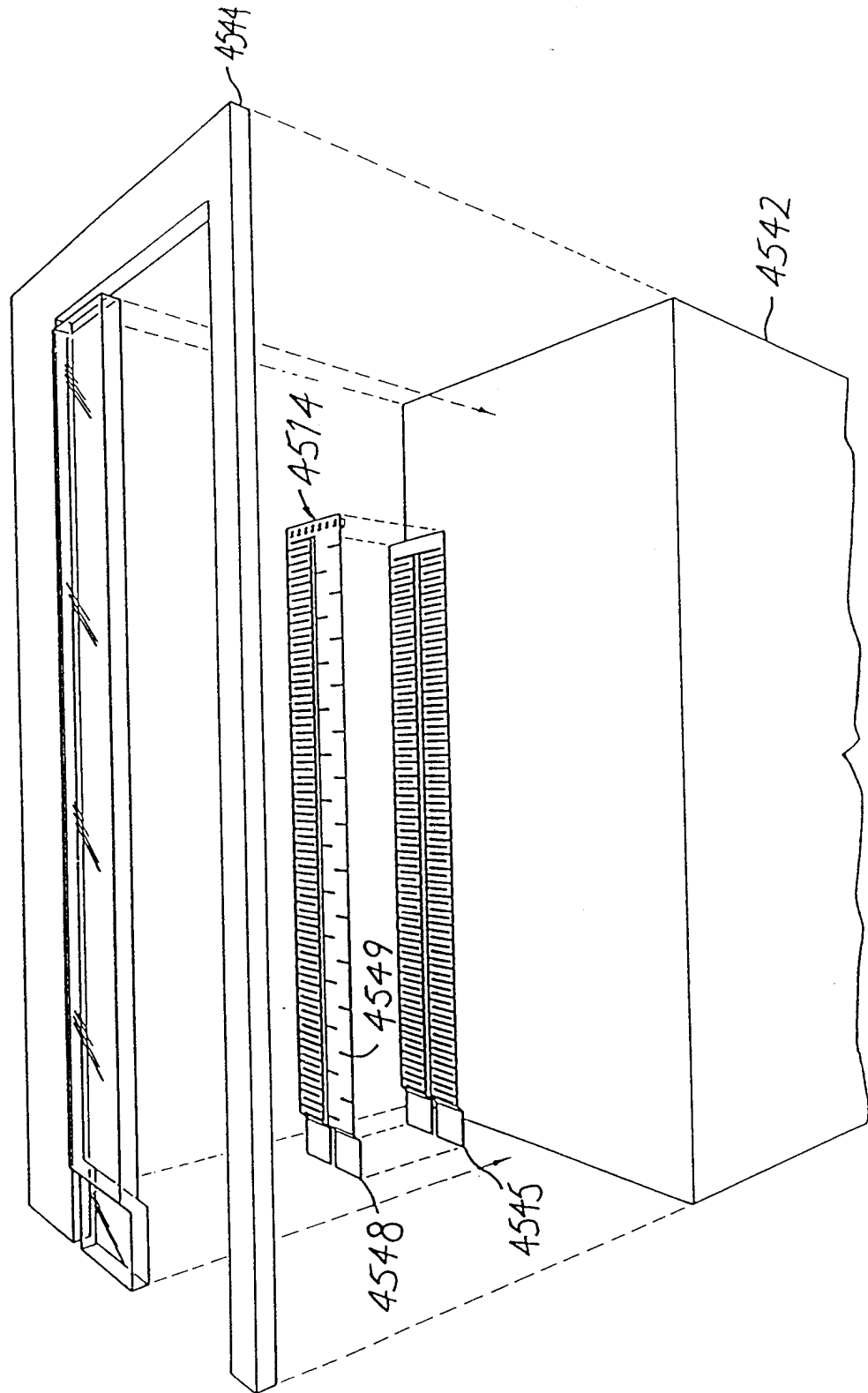


FIG. 681

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 98/00550

A. CLASSIFICATION OF SUBJECT MATTER																						
Int Cl ⁶ : B41J 2/045, 2/055, 2/14, 2/16, 2/165																						
According to International Patent Classification (IPC) or to both national classification and IPC																						
B. FIELDS SEARCHED																						
Minimum documentation searched (classification system followed by classification symbols) Int Cl ⁶ : B41J 2/-																						
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched																						
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WPAT} B41J 41/- AND (ink (w) jet; OR inkjet:) AND print: AND (bend: OR deflect: OR JAPIO} deform: OR arch: OR buckl:) AND (therm: OR heat: OR hot OR temperatur:)																						
C. DOCUMENTS CONSIDERED TO BE RELEVANT																						
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.																				
P,X	US 5719604 A (INUI) 17 February 1998 Whole document, figures 1-10	1,2,10,12,109-111 125,126,129																				
P,X	US 5666141 A (MATOBA) 9 September 1997 Whole document, figures 1-51	1,2,5,10,12,109-111 125,126																				
X	EP 713774 A (SHARP KK) 29 May 1996 Whole document	1,2,10,12,109-111, 125-127																				
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex																						
<p>* Special categories of cited documents:</p> <table border="0"> <tr> <td>"A"</td> <td>document defining the general state of the art which is not considered to be of particular relevance</td> <td>"T"</td> <td>later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</td> </tr> <tr> <td>"E"</td> <td>earlier document but published on or after the international filing date</td> <td>"X"</td> <td>document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>"L"</td> <td>document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"Y"</td> <td>document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>"O"</td> <td>document referring to an oral disclosure, use, exhibition or other means</td> <td>"&"</td> <td>document member of the same patent family</td> </tr> <tr> <td>"P"</td> <td>document published prior to the international filing date but later than the priority date claimed</td> <td></td> <td></td> </tr> </table>			"A"	document defining the general state of the art which is not considered to be of particular relevance	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	"E"	earlier document but published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family	"P"	document published prior to the international filing date but later than the priority date claimed		
"A"	document defining the general state of the art which is not considered to be of particular relevance	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention																			
"E"	earlier document but published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone																			
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art																			
"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family																			
"P"	document published prior to the international filing date but later than the priority date claimed																					
Date of the actual completion of the international search 1 September 1998		Date of mailing of the international search report 15 SEP 1998																				
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No.: (02) 6285 3929		Authorized officer DEREK BUTLER Telephone No.: (02) 6283 2347																				

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/AU 98/00550

C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 19516997 A (SHARP KK) 16 November 1995 Whole document	1,2, 109-111, 125-127, 129
X	DE 19623620 A (SHARP KK) 19 December 1996 Whole document	1,2, 109-111, 125,126
X	Patent Abstracts of Japan, M 997, page 32, JP 2-108544 A (SIEKO EPSON CORP) 20 April 1990 Abstract	1,2,109-111, 125
X	Patent Abstracts of Japan, M 989, page 131, JP 2-92643 A (SIEKO EPSON CORP) 3 April 1990 Abstract	109-111,116
X	Patent abstracts of Japan, M 1403, page 129, JP 4-353458 A (BROTHER IND INC) 8 December 1992 Abstract	1,116
X	Patent Abstracts of Japan, M 1632, page 152, JP 6-91865 A (SIEKOSHA CO LTD) 5 April 1994 Abstract	1
X	Patent Abstracts of Japan, M 1632, page 152 JP 6-91866 A (SIEKOSHA CO LTD) 5 April 1994 Abstract	1
X	Patent Abstracts of Japan, M 1069, page 165, JP 2-265752 A (MATSUSHITA ELECTRIC IN CO LTD) 30 October 1990 Abstract	1

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/AU 98/00550

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

For analysis of lack of unity, only the independent claims have been considered. The analysis results in a total of forty-two claims or groups of claims which are not linked by a special common technical feature.

Several groups appear linked by the common technical feature of a thermal actuator, however thermal actuators per se are well known, for example bimetal strips. Therefore groupings have been made using further special technical features based on the form or type of actuator.

Continued

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-12, 67-77, 109-131, 183-194, 213, 214, 303-326

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

Supplemental Box

(To be used when the space in any of Boxes I to VIII is not sufficient)

Continuation of Box No: Box II Observations where unity of invention is lacking

Similarly, the methods of manufacture groups appear linked by the common technical feature of depositing and etching layers on a substrate, however this general process is well known in a range of fields. Therefore grouping has been made using further special technical features based on the specific layering steps and/or form of the item to be manufactured by the method.

There are claims or groups of claims with special technical features that are not defined in the context of ink jet nozzles/printers per se.

- (a) Claims 1, 2, 67, 109, 112, 116, 125, 130, 183, 213, 303, 315 Ink jet printer with ejection nozzle, thermal bend actuator utilized to eject ink.
- (b) Claim 13 Ink jet nozzle, first actuator ejects ink, second actuator pumps ink in.
- (c) Claims 13(sic)(page 221), 328 Thermal actuator, conductor thinned adjacent attachment to substrate.
- (d) Claim 28 Ink jet nozzle, magnetic actuator.
- (e) Claims 39, 59, 60, 78, 83 Ink jet controlled by shutter means.
- (f) Claim 50 Ink jet nozzle, ink ejection controlled by shutter, shutter controlled by buckle actuated mechanism.
- (g) Claim 87 Ink jet arrangement with plurality of vane units actuated to eject ink by iris type actuator.
- (h) Claims 100, 154, 735, 736 Corrugated heater for thermal actuator or micro mechanical structure.
- (i) Claims 106/160 Thermal actuator with layered high and low coefficient of thermal expansion materials and a conductive material heater, the conductor material having holes to reduce delamination.
- (j) Claims 132, 141 Ink jet nozzle with impeller type paddles.
- (k) Claim 143 Actuated paddle with a hydroscopic surface amendable for the collection of gases.
- (l) Claims 152, 153 Ink jet nozzle with paddle actuated to eject through portal.
- (m) Claims 163, 742 Reducing laminar separation of a series of planar actuation components in a thermal actuator or micro-mechanical device by clamping where fixed to a substrate.
- (n) Claim 168 Ink jet nozzle with actuator mechanism having a portion between nozzle chamber and ink supply.
- (o) Claim 195 Ink jet nozzle arrangement with movable vane actuated from control nozzle chamber.
- (p) Claim 204 Thermal actuator comprising non-conductive strips and a conducting strip of two wires.
- (q) Claim 215 Fluid ejection apparatus with actuated paddle vane ejecting fluid via roof of chamber.
- (r) Claims 227, 240/260, 242/262, 289 Ejecting fluid from first and second nozzle chambers by actuating paddle in two alternate directions respectively.
- (s) Claim 291 Ink jet nozzle arrangement with concave movable paddle vane.

continued

Supplemental Box

(To be used when the space in any of Boxes I to VIII is not sufficient)

Continuation of Box No: II Observations where unity of invention is lacking.

- (t) Claim 327 Thermal actuator having two layers of similar properties acting against each other when cool.
- (u) Claims, 329/340, 351 Ink jet nozzle arrangement with actuated paddle forming wall around nozzle rim.
- (v) Claims 364, 370, 384, 391, 420, 427, 444, 458, 474, 490, 497, 504, 511, 527, 536, 557, 574, 581, 596, 610, 618, 633, 649, 664, 680, 692, 706, 720 Method of manufacturing ink jet print heads of various types having thermal actuators, by depositing and etching layers on a substrate, with no specific steps comparable with other grouped methods.
- (w) Claims 377, 451, 480 Method of manufacturing ink jet print heads including a series of nozzle chambers by depositing and etching layers on a semiconductor wafer having an electrical circuitry layer and a buried epitaxial layer, with steps not directly comparable with other grouped methods.
- (x) Claims 398, 412, 434, 465, 518 Method of manufacturing ink jet print heads including a series of nozzle chambers by depositing and etching layers on a semiconductor wafer having an electrical circuitry layer, with steps not directly comparable with other grouped methods.
- (y) Claim 543, 564 Method of manufacturing a thermally actuated ink jet printer by depositing and etching layers on a silicon wafer having an electrical circuitry layer for operation of thermal actuator, with steps not directly comparable with other grouped methods.
- (z) Claim 588 Method of manufacturing a thermally actuated ink jet printer by depositing and etching layers on a silicon wafer, with steps not directly comparable with other grouped methods.
- (aa) Claim 603 Method of manufacturing ink jet printer having paddle vane ejecting ink via exposed roof of a trough, by depositing and etching layers on a silicon wafer, with steps not directly comparable with other grouped methods.
- (ab) Claim 625 Method of manufacturing ink jet printer having paddle vanes moving to eject ink from two alternative apertures, by depositing and etching layers on a silicon wafer, with steps not directly comparable with other grouped methods.
- (ac) Claim 640 Method of manufacturing a thermally actuated ink jet printer by depositing and etching layers on a silicon wafer, with steps not directly comparable with other grouped methods.
- (ad) Claim 656, 687 Method of manufacturing an ink jet printer nozzle including a concave paddle vane, by depositing and etching layers, with steps not directly comparable with other grouped methods.
- (ae) Claim 671 Method of manufacturing an ink jet print head by depositing and etching layers on a semiconductor wafer, with steps not directly comparable with other grouped methods.
- (af) Claim 699 Method of manufacturing an ink jet print head by depositing and etching layers on a semiconductor wafer, with steps not directly comparable with other grouped methods.
- (ag) Claim 727 Method of manufacturing an ink jet print head by depositing and etching layers on a semiconductor wafer, with steps not directly comparable with other grouped methods.
- (ah) Claims 738, 763 Micro-mechanical liquid pumping system utilizing hydrophobic material.

Continued

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International Application No.
PCT/ AU 98/00550

Supplemental Box

(To be used when the space in any of Boxes I to VIII is not sufficient)

Continuation of Box No: Box II Observations where unity of invention is lacking.

- (ai) Claims 746, 747, 750 Constructing conducting portions in a non-conductive material by utilising wires, for thermal actuator.
- (aj) Claim 754 Micro-mechanical actuator element with first member of high coefficient of thermal expansion and a serpentine heater of lower coefficient of thermal expansion and a serpentine heater of lower coefficient of thermal expansion so that heated heater elongates to accommodate expansion of the first material.
- (ak) Claim 755 Micro-mechanical actuator element with two layers having different coefficients of thermal expansion and a heater in contact with both layers.
- (al) Claim 760 Micro-mechanical planar flow control system with integral grill structure.
- (am) Claim 766 Thermal actuator with independently heated resistive elements on a common line expanding to give controlled vertical and horizontal movement.
- (an) Claims 780, 786 Method of controlling a micro-mechanical structure system on a semiconductor wafer with integral circuitry layers utilising a sacrificial etchant.
- (ao) Claim Lever arrangement with resilient rotation of the levers.
- (ap) Claim 796 Interconnection of external lines to an integrated circuit.

Information on patent family members

PCT/AU 98/00550

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report				Patent Family Member	
US	5719604	DE	19532913	JP	8-90769
US	5666141	EP	634273	JP	7-25009
EP	713774	JP	8-142323		
DE	19516997	JP	8-20108	JP	7-304170
DE	19623620	JP	8-336965		
END OF ANNEX					